

PRACTICAL OBSERVATIONS
ON THE
TREATMENT
OF
STRICTURES IN THE URETHRA,
AND
IN THE CÆSOPHAGUS.

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BY
EVERARD HOME, ESQ. F. R. S.
SURGEON TO ST. GEORGE'S HOSPITAL.

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— Omne per ignem
Excoquitur vitium. — VIRG. GEORG.

THE SECOND EDITION,
VERY MUCH ENLARGED.

LONDON:
PRINTED FOR GEORGE NICOL, BOOKSELLER TO HIS
MAJESTY, PALL-MALL; AND J. JOHNSON,
ST. PAUL'S CHURCHYARD.
1797.

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TO

DOCTOR PATRICK RUSSELL.

MY DEAR SIR,

ALLOW me to dedicate to you the following Observations, that your friendship for the Author, and the high sense he has of its value, may be known to the public.

You who, with unexampled magnanimity, have successfully explored the nature of the most dreadful of human maladies, will see in a favourable light whatever tends to investigate, or relieve, the symptoms of disease.

From you I am certain of the
indulgence of a Friend, and your
protection will give a favourable bias
to the public opinion.

I remain,

with the highest esteem,

your sincere Friend,

*Leicester Square,
Nov. 3, 1795.*

EVERARD HOME.

PREFACE

TO THE SECOND EDITION.

WHEN I had prepared the first Edition of this Treatise, I felt myself justified in laying it before the public, by the experience I had then acquired of the mode of treatment which it was intended to explain.

The reception it met with, has afforded me extensive opportunities of confirming my former observations, and of making many additions. It has also brought before me a greater variety of cases, in different stages of this disease, than could have been collected in any situation, except in the metropolis of a great empire.

Having derived from my former publication those advantages, by which my knowledge of the disease, and of the mode of treating it, have been materially improved, I feel it a duty that I owe to the public to render a work, which has been marked by their approbation, as far as I am able, deserving of it.

It has been objected to the first Edition, that the cases are all favourable, and that, in most of them, the patients were stated to have recovered in a short period; whereas some of those in which I have been since employed, have been much more tedious, and others unattended with success.

To this truth I shall give a very plain answer. I published, in my first Edition, all the cases attended with difficulty, which had at that time come under my care, and stated the circumstances, whatever they were, that occurred.

If I am now enabled to give a more ample detail of cases, it has arisen in part from this ; that the former publication induced many patients to apply to me for relief, who had found all other means of treatment ineffectual.

Among those, I have met with cases more obdurate than any I had before known, more difficult to remove, and some few in which though relief has been afforded, the cure has not been completed.

The difficulties I have met with, the delays which have occurred, and the failures I have experienced, all have a place in the present Edition, equally with the successful cases ; and even more stress is laid upon them, since they will convey to the minds of practitioners much useful knowledge, and must tend materially to improve this important branch of surgery. It will however appear, that the unsucces-

ful cases bear a very small proportion to the rest ; and that the practice has been fully and completely confirmed by very extensive experience.

Leicester Square,

Nov. 3, 1797.

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INTRODUCTION.

IN laying before the Public the following observations on the treatment of a very painful and distressing complaint, and endeavouring to obviate the objections that have been thrown out against the use of caustic, as a remedy, I am actuated by two motives; the desire of rendering a service to my Profession, and that of paying a new tribute of gratitude to the memory of Mr. Hunter; to whose ingenuity the world is indebted for the original proposal of such a mode of practice, and the invention of a safe and easy method of conveying the caustic to the seat of disease. I cannot better perform either of these tasks than by attempting to elucidate and extend his very useful discoveries.

Mr. Hunter is universally allowed to have been a skilful anatomist, nor has any one been hardy enough to deny that he excelled his cotemporaries in an intimate knowledge of the changes in structure, which are met with in different parts of the body, in consequence of their having been diseased. In these acquirements he was unrivalled; and in pursuing them, he brought to light the information we at present possess respecting the nature of Strictures in the Urethra.

The account he has published of the different stages of this disease, taken from actual observation in the dead body, and illustrated by engravings, contains a connected body of evidence, established upon facts, to which no one can refuse an assent. There are, however, practitioners who are unwilling to give more credit to these facts than is absolutely necessary. They admit such cases to occur, but at the same time do not choose to give up the opinions they had formerly imbibed; and this they reconcile

to themselves, by supposing the appearances mentioned by Mr. Hunter to arise only in extraordinary cases, while those taken notice of by former writers, are more commonly met with; but in support of this no anatomical facts can be produced.

In surgery, as in other practical arts and professions, attempts at improvement are considered by many as hasty and unwarranted innovations. This caution, when restrained within proper bounds, answers a good purpose, by inducing men qualified for the task, to examine with accuracy whatever improvements in the art are proposed; and to prevent all those which do not bear the test of their inquiry from being obtruded on the world.

This salutary care degenerates, however, in less liberal minds into mere jealousy, and leads the prejudiced to condemn improvements without putting them to the trial, or even making themselves masters of the intentions for which they were proposed.

I have been led to, make these observations from recollecting a circumstance, which happened when the mode of applying caustic to strictures was first introduced into practice. At that time a gentleman who had many years laboured under the disease, and had in vain tried every other mode of treatment then in use, upon hearing that some improvements had been proposed by Mr. Hunter, was desirous of availing himself of them; he consulted four of the professors of one of the first universities in Europe upon this subject: he stated, that in the present stage of the disease no bougie could be passed; that the symptoms were of a very distressing nature; and he requested their opinion respecting the use of the caustic, or any other mode by which they thought he might obtain relief. These gentlemen subscribed their names to the following written opinion.

“ That they had no mode of relief to recommend; but that the application of caustic was a practice which they did not

hesitate to condemn; since they thought the disease, bad as it might be, was more supportable than so violent an application, which must be productive of the worst consequences, both on the urethra and bladder."

This was their opinion, with which they were so well satisfied, that a number of facts, stated by a surgeon high in practice, higher in reputation, and unimpeached in veracity, had not sufficient weight to raise a doubt in their minds. This opinion, so signed, was afterwards put into my hands by the patient, who had the courage, notwithstanding this declaration, to submit to the use of the caustic; from which he received considerable benefit, without experiencing any of the dreadful effects they had so strongly predicted.

That practitioners should not hastily adopt a mode of practice of which they were afraid, and the effects of which they could not reconcile to the doctrines they had been taught, is natural and right; in

justice to their patients, as well as to themselves, they were to wait till the practice was sufficiently established to authorize them in their acquiescence.

This is the line of conduct impartial men would naturally pursue; but to form an independent judgment requires more resolution than many possess; and to investigate an intricate disease demands more opportunities, as well as professional acquirements, than fall to the share of every practitioner.

To approve or condemn without a knowledge of the subject, requires nothing more than prejudice; by such prejudice Mr. Hunter's opinions have been too often estimated, and any opposition to which they were liable from this mode of judging, his natural warmth of temper, and want of knowledge of the world, made him ill qualified to avoid or to repel.

Mr. Hunter has been held out to the world as a man of ingenuity, and of a speculative turn, who indulged himself in

forming theories, and advancing opinions, whose chief merit was their novelty and singularity. This character has been artfully applied to him, by affecting to give him a certain degree of credit, but in reality to take from his professional labours their true value, which arises from their being the result of deductions from facts, either developed in the progress of disease, or brought to light by experiments instituted for that purpose.

His real character was directly contrary to the representation above mentioned. So far from being of a turn for fanciful speculations, his mind was exclusively fitted for the investigation of practical and experimental truth; he had ever an aversion to all hypothetical reasoning, and in disquisitions of every kind, the only part that interested him was the authenticated facts which they contained. Hence it was, that he had little taste for works of imagination or poetry; his attention being so much absorbed in considering the combination of the facts,

that he overlooked the other beauties of the composition.

This turn for research formed the most prominent feature in the character of Mr. Hunter; it never left him, it never could be said even to be dormant, and he was always happy when allowed to indulge it. To this natural bent of his mind, the world is indebted for his uncommon exertions in promoting medical science, and extending his experimental inquiries.

In the investigation of whatever engaged his attention, he not only formed no theory of his own, but even disregarded the observations of those who had preceded him; leaving his mind unbiassed, to make use of its own powers in procuring the various facts from which his future observations and conclusions were to be drawn.

This mode of prosecuting medical inquiry, upon the model of the great Lord Verulam, which is seldom so strictly employed, required the genius and talents of a Hunter to insure its success. His educa-

tion under his brother allowed him to lay in a stock of anatomical facts, respecting both health and disease, which formed a solid foundation for his future acquirements; his natural perseverance made him unwearied in his labours, and unremitting in his pursuits; and his zeal for improvement, which amounted to enthusiasm, supported him under the difficulties and disappointments, which in researches of that nature so frequently occur.

Anatomical and medical facts collected and registered by such a man must prove of infinite value; they are materials of which every one may avail himself, who is engaged in the same pursuits, independent of any opinions whatever. Some of his conclusions, from the fallacy of human reasoning, may prove erroneous: others, although just, may be afterwards found to have been extended beyond their proper limits; but the facts themselves must remain, and in the course of progressive improvement, may materially assist in ex-

ploring many laws of the animal economy, both in health and disease, with which we are at present almost entirely unacquainted.

That part of Mr. Hunter's labours which is connected with the subject of the present observations, consists wholly of facts, nothing rests upon opinion, either with respect to the nature of the disease, or the mode of treatment.

In his works we have a detail of the symptoms and appearances in the different stages of strictures in the urethra. Where the stricture was impervious to the bougie, he was led, from the nature of the obstruction, to see the inefficacy of that instrument; he therefore considered himself warranted in resorting to other means, and had recourse to the application of the *argentum nitratum*, or lunar caustic.

This mode of treatment he found, upon trial, capable of destroying the stricture, without doing any material mischief to the urethra; he made use of this application in a number of cases, and finding it suc-

cessful, was led to adopt the practice, and lay it before the public.

In making these remarks I have not been actuated by the wish to pass censure on those who differ in opinion from the late Mr. Hunter; but to do justice to his professional abilities, which although generally admired, are not sufficiently understood.

I have been prevented from going more at length into this subject, from the consideration that I was too nearly connected with him to be admitted as an impartial judge; and the event of his death is still too recent to allow the passions and prejudices of his cotemporaries to have subsided, and his merits to be held in their due estimation.

From the same motives, when I felt myself called upon to give a short account of his life, I was led to confine it to bare facts, and simple events; reserving such observations as might be thought to rest upon opinion, to some more distant period. I

could not, however, offer to the public the remarks contained in the following pages, without having previously stated what Mr. Hunter had done on the subject, the additions he had made to our knowledge of the disease, and the improvement he had brought forward in the manner of treating it.

OF STRICTURES, &c.

CHAPTER I.

OF STRICTURES IN THE URETHRA.

I PROPOSE in the following pages to consider the common mode of treating Strictures in the Urethra ; to point out cases in which that method is not found to answer ; and recommend a practice which, in those instances, affords a more favourable prospect of success.

It will be necessary, before I attempt to fulfil any of these intentions, to explain the nature of the disease itself, and distinguish it into its different stages ; that the principle upon which the mode of treatment depends, may be the better understood.

Concerning the nature of this disease, I shall not be able to add much to what has

been published by the late Mr. Hunter; and it was originally my intention to have referred the reader to his work. This, however, upon consideration, appeared liable to many objections. I saw an evident impropriety in not laying before the reader at one view, the observations and practical remarks I have to offer, and the data from which they were deduced.

In explaining the nature of strictures, I shall confine myself wholly to facts; and shall not venture to take notice of any that have not come immediately within my own knowledge. If at the same time, cases recorded in Mr. Hunter's work are mentioned, they will be only those with which I had an opportunity of making myself perfectly acquainted.

SECTION I.

OF THE NATURE OF THE MEMBRANE OF
THE URETHRA

THE internal membrane of the urethra in men, lines the canal, which is destined to carry two very different fluids, the urine and the semen, and in very different quantities. When the urine passes, the canal is large; when the semen is thrown out, it is small, the membrane having a power of adapting itself to these two different states; and this power of action within itself, is similar to muscular contraction and relaxation.

It may be difficult, and perhaps impossible, to prove this membrane to be muscular, either from its appearance, or from examination of its texture; since the peculiar structure upon which the contraction of a muscle depends, has not as yet been

ascertained. I shall therefore content myself with observing, that other structures, apparently membranous, and equally unlike the fasciculated fibrous texture commonly met with in muscles, are endowed with a power of contracting and relaxing, in a much greater degree than is ever found to take place in the membrane of the urethra. The *Tænia hydatigenia ovalis*, an animal consisting of a semi-transparent membranous bag, met with in the brain, liver, and omentum of sheep, when taken from its natural situation, and kept in tepid water, contracts and relaxes the different parts of its bag to a considerable extent.*

That the membrane, which forms the lining of the urethra, does occasionally contract when stimulated, may be illustrated by a variety of instances, both in health and disease. In hot weather, when

* An account of this animal is given by the Author, in the Croonian Lecture, for the year 1790, and published in the First Part of the 85th Vol. of the Philos. Trans.

the urine contains a greater proportion of salts, from an unusual quantity of the watery parts of the blood being carried off by perspiration, and the stream is rendered smaller than common, by the stimulating quality of the urine producing contraction in the internal membrane of the urethra. When a portion of this membrane is in an inflamed state from gonorrhœa, its surface is more readily stimulated, and the urine, even when diluted, by the patient taking watery fluids frequently into the stomach, which pass by the kidneys, causes it to contract so much, that the urine comes away only in drops, or a very small stream; in this state of the parts, if the penis be immersed in warm water, the effect of the stimulating urine is less sensibly felt by the membrane of the urethra, which frequently becomes relaxed, and the water passes more freely. After the inflammation of gonorrhœa is gone off, and stimulating injections are used, with a view to stop the discharge which continues; in many instances where the in-

jection stimulates the parts to a great degree, it will not pass on towards the bladder, but produces so strong a contraction in the membrane, as entirely to obstruct the course of the injection, and frequently reject it altogether with considerable velocity.

SECTION II.

OF THE FORMATION OF STRICTURES.

THIS natural power of contraction, which has been explained in the last section, is common to the whole canal of the urethra, although probably not equally great in every part of it, and as the bladder is the only antagonist muscle, when the contracted state has once taken place, it must continue till counteracted by that viscus expelling its contents, and forcing open the passage.

This contraction and relaxation are the natural and healthy actions of the urethra; but this membrane, like every other muscular structure, is liable to a spasmodic action, which produces a degree of contraction beyond the natural; and in that state the canal loses the power of relaxing till the spasm is removed. When this happens,

it constitutes disease, and is termed a spasmodic stricture.

While a stricture is in this stage, it is only a wrong action of the membrane of the urethra ; and if the parts could be examined, in their relaxed state, there would be no appearance of disease.

When a portion of the urethra is disposed to contract beyond its natural easy state, this disposition commonly increases till the part becomes incapable of falling back into a state of complete relaxation, and the canal remains always narrower at that part.

In this stage it is both a permanent stricture, and a spasmodic one. It is so far permanent, that it is always narrower than the rest of the canal ; and so far spasmodic, that it is liable to contract occasionally in a still greater degree.

A stricture in the urethra, whether in the spasmodic or permanent state, is a contraction of the transverse fibres of the membrane, which forms that canal.

When this contraction is in a small

degree, it appears, upon examination after death, to be simply a narrowing of the canal at that part; but when the contraction is increased, it becomes a ridge projecting into the canal: this last is the appearance of what is understood by a permanent stricture.

The thickness of a stricture is a subject on which there are many different opinions, and some have supposed it to be of considerable extent. It is, however, commonly no more than the thickness of a single fold or doubling of the membrane of the urethra. The ridge which projects into the canal, can only be a single fold, with the cellular membrane between the two portions; it will be thicker as it approaches the side of the urethra.

This is the appearance the parts have exhibited in the cases that I have examined after death, and my opportunities of seeing it have been so frequent, that I do not hesitate to consider such contraction as the most general cause of strictures.

There is a circumstance which readily accounts for the opinion of strictures being of some thickness, this is, two strictures forming within an inch of each other, and the space between them becoming narrower than the rest of the canal, although not so much so, as at either of the strictures. This is frequently met with.

The stricture is generally all round equally, the ridge projecting to the same distance, from every side of the urethra. It sometimes happens that it only projects from one side. I have met with cases where there were three strictures, and all on the same side of the urethra, the other being perfectly smooth. This is a fact which cannot be ascertained after the canal is laid open in the dead subject, but is readily discovered in the living body, by passing a soft bougie through the stricture, which takes an exact impression of it.

In the first edition of this work, I divided strictures into spasmodic and permanent, to express two very different stages of this

disease. I wish, however, now to be understood, that all strictures which are not impervious, are properly spasmodic, as they are all capable of being more contracted at one time than another; so that a stricture having arrived at that stage which renders it permanent, does not prevent it from having also a spasmodic contraction. This, however, in many instances is in a less degree after the disease has been of some years continuance, than at a more early period; for we find patients who have been subject to occasional suppressions, afterwards entirely free from them, the disease in its increase having rendered the parts more indolent, and therefore not so readily affected by accidental causes; but when the stricture becomes very small, the occasional suppressions return, and become more serious.

SECTION III.

OF THE SITUATION OF STRICTURES.

As a necessary step towards ascertaining the situation of strictures in this canal, its natural size should be pointed out. This, I believe, has not hitherto been done; I shall therefore be more particular in my statement of the dimensions.

To determine with precision the length as well as width of the urethra, I took exact casts of it in wax, stretching it in the dead body as much as it would readily bear; in this way I procured a bougie of the size of the urethra. The subjects from which these casts were taken were of different ages, one was between 70 and 80, the other 30. In both of them the penis was of a small size, and the external orifice at the glans unusually small in the collapsed state.

The length of the canal corresponded exactly in both casts.

From the external orifice to the neck of the bladder was 9*

From the external orifice to the bulb of the urethra 7

The membranous part, extending from the bulb to the prostate gland $1\frac{1}{2}$

The canal passing over the prostate gland $\frac{1}{2}$

The width of the urethra varies in different parts of the canal, and is every where much larger than I had any idea of, exceeding the size of the largest bougie I have ever used, in a very great degree. To make the diameters of the urethra in its several parts more clearly understood, I shall contrast them with those of bougies.

The diameter of a common sized bougie - - - - - Inch. $\frac{4}{20}$

Of the largest sized bougie I have ever used - - - - - $\frac{5}{20}$

* The canal in a relaxed state is in common about $8\frac{1}{2}$ inches long.

The diameters of the casts of the years old.

Urethra, in different parts. 80. 30.

At $\frac{3}{4}$ of an inch from the external orifice - - - $\frac{9}{20}$ $\frac{7}{20}$ $\frac{1}{2}$

At $4\frac{1}{2}$ inches from the external orifice - - - $\frac{7}{20}$ $\frac{7}{20}$

At the bulb of the urethra, 7 inches from the orifice - $\frac{12}{20}$ $\frac{13}{20}$

In the membranous part, directly beyond the bulb, $7\frac{1}{2}$ inches from the orifice* - - - $\frac{7}{20}$ $\frac{4}{20}$

In the membranous portion near to the prostate gland, $8\frac{1}{4}$ inches from the orifice - - - $\frac{9}{20}$ $\frac{7}{20}$

Where the membranous part terminates, and the prostate gland begins, $8\frac{1}{2}$ inches from the orifice $\frac{7}{20}$ $\frac{6}{20}$

In the middle space of the prostate gland, $8\frac{3}{4}$ inches from the orifice - - - $\frac{11}{20}$ $\frac{10}{20}$

At the neck of the bladder, 9 inches from the orifice† - $\frac{9}{20}$ $\frac{8}{20}$

* In the man 30 years of age there had been a stricture at this part. † Vide Plate I. Fig. 1. and 2.

From these measurements the urethra appears not to be uniformly of the same width, and the narrowest part is $\frac{1}{20}$ of an inch wider in its diameter than the largest sized bougie. It is a fact of no small importance, that the two parts that are naturally the smallest are those most liable to stricture.

These dimensions are to be understood as much beyond those of the easy state of the urethra ; they do not, however, exceed the size to which the canal is sometimes enlarged in the living body, when circumstances occur that require it. They give us a more extensive idea of the powers of contraction and relaxation possessed by this membrane, than has been commonly imagined.

Strictures occur most commonly just behind the bulb of the urethra ; the distance from the external orifice being $6\frac{1}{2}$ or 7 inches ; the situation next in order of frequency, is about $4\frac{1}{2}$ inches from the orifice

of the glans; they do occur at $3\frac{1}{2}$ inches, and sometimes almost close to the external orifice.

In some cases the external orifice itself is contracted; when this happens it is sometimes the source of considerable errors, since it misleads the surgeon, who supposes the whole canal to be naturally formed of the same size. When the orifice of the urethra has a pouting appearance, it is almost always in a contracted state, and appears smaller than it really is.

The prepuce is also very often contracted, which is called a natural phymosis; this I am led to believe happens more frequently in those who are disposed to strictures than other men; at least I have often met with it in patients who had strictures.

In almost all the cases which have come under my care, there has been one stricture about 7 inches from the external orifice, whether there have been others or not; that part of this canal would therefore

appear to be much more disposed to contract than the rest of the urethra.

This is a fact I have long known, but could not account for it till I made casts of the urethra; from them I saw that there is a natural contraction in the urethra, just behind the bulb, probably intended to prevent the semen which is collected there from passing back at the time the *acceleratores urinæ* muscles are acting, to propel it along the canal.

This particular part of the urethra in the natural state has an uncommon degree of irritability; a proof of this is its being affected by blisters, and contracting spasmodically, so as to produce strangury. Whether the contraction is confined to that part, or extends along the whole of the membranous portion, I am unable to determine; but that the contraction is at that part, I have been able to ascertain. A young gentleman in a fever had a blister applied to the chest; a strangury came on. Under these circum-

stances a bougie passed readily $6\frac{1}{2}$ inches, but could not, although of a small size, be passed further; the strangury went off with the effects of the blister.

SECTION IV.

OF THE CAUSES OF STRICTURES.

STRICTURES in the urethra have been generally considered to arise from some new formation of parts in the canal, in consequence of disease; and have been supposed to have their origin in a previously distempered state of the membrane, either from gonorrhoea itself, or the effects of some violent application made use of in the treatment of that disease.

From what has been said of the internal membrane of the urethra, it will appear evident that a constriction of any particular part of the canal, may be brought on by an unusual or preternatural degree of action in the membrane itself, without any new formation whatever; and therefore, when this is the case, the complaint may be considered as a diseased action of natural parts,

which may be brought on by a variety of causes.

In some constitutions the natural disposition for contraction in this membrane, will be much stronger than in others, and in some may be so strong, as to take place at a very early age, and in consequence of a degree of irritation so slight as not to have been noticed.

An instance of this kind I have met with, at ten years of age.

The stone is, in many instances, a cause of stricture; this happens sometimes in infancy. I have met with cases of this kind at six years old, and very frequently at a more advanced age, as will appear in the Cases.

As strictures of long standing put the bladder under the circumstances most favourable for the formation of stone, and stones are sometimes met with that appear to have had their origin from that cause, it might, at first view, be supposed, that wherever the two diseases are combined,

this had been the case. We might, however, conclude, when the stricture is very slight, and easily overcome, and the stone of considerable size, that the stricture was the effect, not the cause; this is also strengthened, by the urethra in most patients who have the stone, being in a very irritable state, and readily affected by spasm.

Diseases of the prostate gland have been found to produce strictures, which may be accounted for from the irritation which is produced in the urethra by that disease; the stream of urine being also rendered small as it leaves the bladder, may assist in producing this effect, since the urethra can never be dilated to its natural size.

There is reason to believe, that in many instances the inflammation in the venereal gonorrhoea is the cause of this complaint. It appeared to have been so in the following case.

A gentleman, twenty-five years of age, who had resided many years in Spain, returned to this country, and almost imme-

diately on his arrival contracted a gonorrhœa. The urethra was extremely irritable; the inflammation very violent, and it extended itself over the surface of the glans penis, and prepuce. Injections of milk and water gave pain; mercury disagreed with his constitution, bringing on heat, uneasiness, and symptoms of general irritation, so that it was left off. No local application that could be devised gave the smallest relief; even oil was unpleasant; but fresh cream was, by accident, discovered to have a soothing effect, and was the only thing used during the inflammatory stage, which lasted for three weeks. The discharge continued, and bark was given internally, but could not be persevered in, as it disagreed with the stomach. Steel also heated him. The balsam copaiva had the same effect: in short, no plan that was tried seemed to answer; they were therefore all given up.

Two months after, the discharge still continued; and upon passing a bougie it was discovered that a stricture had formed near

the bulb of the urethra, which readily yielded to the use of the bougie; and in two months more the patient recovered.

I have met with so many instances where the symptoms of stricture had been immediately preceded by a severe gonorrhœa, from the effect of which the membrane had never recovered, that I have long had little doubt in my own mind of gonorrhœa being a very general cause of strictures. I have remarked, that when this has been the case, the venereal inflammation has not been confined to the space near the glans, which is most commonly the seat of it, but has extended itself along the canal, and brought on a great degree of irritation in the membranous part of the urethra; which has probably given a disposition to the canal at that part to form stricture. This opinion is corroborated by a gentleman who has had a high situation, for sixteen years, in the Marratta army in the East Indies, and who, from being entirely domesticated among the natives, had ample

opportunities of gaining accurate knowledge upon this subject. He assures me, that three-fourths of the natives of rank are troubled with strictures, which is entirely attributed to the effects of gonorrhœa, for the cure of which no local applications are in use. There prevails, however, a strange depravity among the natives in India, which I think may justly be considered as disposing the parts to form strictures. This is toying with women, and prolonging the venereal act for a very unnatural length of time; taking medicines which are supposed to contribute to the possibility of that continuance. That keeping the parts in such a state for a very great length of time, must bring on a state of irritation is self-evident, and the frequent repetition of such acts must dispose them for spasmodic affections, the forerunner of strictures. The extent to which this strange abuse is carried among the native Indians, is such as could not be believed without the strongest testimony.

An improper indulgence in venereal plea-

tures, by which is to be understood a more frequent repetition of that act than the parts are able fully to accomplish, is in Europe productive of great irritation, even where there is no stricture; and when that disease has previously taken place, often brings on suppression of urine. Are we to wonder then at its producing much more serious consequences in the irritable, debilitated constitutions of the natives of a hot climate, whose excesses in pleasures of this kind fill up a principal part of their time.

It is necessary to observe, that in warm climates strictures, as well as all other spasmodic diseases, are much more readily brought on than in Europe, the climate disposing the parts to fall into such actions.

on Injections have been charged with being the cause of strictures; how far this is true it may be difficult to determine. For as a stricture frequently comes on after a gonorrhœa, where no injection has been used, its appearance after a gonorrhœa cured by

injection, cannot amount to a proof that this application contributed to the effect. It appears, however, highly probable, that where there is a disposition for stricture, injections may increase it; and I think the following case is one of those which have tended to give currency to that opinion.

A gentleman from the West Indies, twenty-three years of age, had a gonorrhœa, the symptoms of which were by no means severe; an injection of *saccharum saturni*, in the proportion of a scruple to eight ounces of water, was used, and made stronger as the symptoms abated: the discharge, however, continued, and after trying the bark, the balsam copaiya, and using the cold bath, for three months, without the smallest benefit, I passed a bougie, and found that a stricture had formed near the bulb of the urethra; this was dilated by the use of the bougies.

Since this work was first published, a number of cases of stricture have come under my care, that were considered by the

patients themselves, to be the immediate effects of injections; in many of these I was inclined to attribute their opinion to prejudice, and therefore did not venture to draw any conclusions from them. I have, however, seen two or three instances where, from using injections less diluted than they ought to have been, the irritation was almost immediate, in the middle of the canal, where the injection stopped; and the formation of a stricture in that part, which is not commonly the seat of the original disease, could be actually traced to the use of the injection. The internal membrane had become thickened, in consequence of inflammation forming a swelling, which was felt externally, through the common integuments.

These instances, which do not admit of a doubt, led me to pay more attention to this subject, and I have since been induced to believe, that many of the accounts I had before discredited, were not unworthy of attention. In those cases of stricture, at-

tributed to injections, it is to be observed, that the application had generally given unusual pain, and brought on an irritation in the membranous part of the urethra, or at the neck of the bladder, as it is more commonly termed; which proved both tedious and troublesome, before it could be removed.

That injections injudiciously used, have in some individual cases disposed the canal to stricture, I think is supported by facts beyond the reach of controversy. There is, therefore, in all irritable habits, some danger of an injection producing this effect; since whenever the stimulating powers of the injection are greater than the membrane of the urethra in that person can bear, which cannot be *a priori* ascertained, a state of irritation is the consequence.

From the idea that injections do sometimes produce strictures, and that we are unable beforehand to determine in what cases they may be used with impunity, I have been induced entirely to forego their

use in the treatment of gonorrhœa, rather than incur a risk, however small it may be, of producing so seriously distressing a complaint.

That no specific complaint is necessary to bring on stricture, cannot be more strongly proved than by cases in which it has arisen from accidental violence, even when applied to the external parts. Of this I have met with two instances, immediately under my own observation, and have heard of several others. That any violence committed upon the perinæum brings on a suppression of urine, is a fact requiring no proof: but as this effect may by many be referred to inflammation of the neck of the bladder, rather than stricture in the urethra, I shall give a particular account of a case of this kind, in which I had an opportunity of examining the parts after death, and ascertaining the nature of the obstruction, which was exactly similar to the strictures commonly met with.

A. B. a seaman, aged about thirty, in stowing the hold of a ship of war, received a violent blow upon the loins from a piece of wood, which knocked him down, and he fell upon the edge of a cask which passed between his thighs, and struck him on the perinæum. For some time he was insensible, and when he got up, the parts were exceedingly swelled, and he was for several months unable to make water without first using the warm bath. An enlargement and hardness continued upon the whole perinæum, from the time of the accident. He continued in this state for a considerable time, and at last grew something better, passing matter with his urine, and having a violent straining to make water, which continued till the bladder was completely emptied.

After four years had elapsed, he was received into the Royal Naval Hospital at Plymouth, at which time he was exceedingly reduced, and had great difficulty in making water, constantly straining, and being in the

greatest agonies on every attempt. When I was called to him, he never made more water than a tea-spoonful at a time.

I attempted to pass a bougie, which stopped at seven inches from the external orifice, the catheter stopped at the same place; and from that part the whole perinæum was swelled and hard: the bladder also being distended and enlarged reached nearly to the navel. I ordered him into the warm bath, where he staid above a quarter of an hour, and I again attempted to pass the catheter, but with no better success.

In about a quarter of an hour he felt something come away, and the urine continued to pass, till he was quite fatigued, in a small stream, in all about three pints. After this, he felt very much relieved, and slept that night exceedingly well; next day, however, he was obliged to strain as before, without bringing any thing away.

He took the Canada balsam and æther; but rather got worse, from not having his water drawn off.

The day following, being the 10th of August, he was no better, and took an opening medicine, which relieved him much; and he passed some water, without straining very violently through the day.

On 12th. He was much worse; went into the bath, but was not relieved by it; remained exceedingly weak and exhausted, and died on the following day.

After death the body was examined, and a stricture was found about seven inches from the external orifice, which rendered the canal nearly impervious at that part. Its thickness did not exceed the tenth of an inch; ulceration had taken place over the whole surface, between the stricture and the bladder, without having formed a passage outwards at any one part. The stricture, in its appearance, was exactly similar to those found in other cases.

Strictures may be caused by any irritation which affects the membrane of the urethra. Blisters in some instances produce them; of which the following case is an instance.

A gentleman, sixty years of age, has an irritable stricture at seven inches, which has been very troublesome for seven years, attended with frequency in making water, a discharge of mucus from the bladder, and occasionally pain in the perinæum. He was free from complaint in these parts till forty years of age, when he was attacked at Bristol by a fever, in which he was delirious for seven days; during that period he was blistered on several different parts of his body, so as to be a whole week under the influence of blisters. When he came to himself, he found a very violent irritation at the neck of the bladder, and in the perinæum; this continued very severely for a year, after which it diminished, but did not go off; for the next year it was less violent. At the end of two years the constant uneasiness subsided; but from that time, upon riding, drinking freely, or any exertion, he has been subject to occasional returns; and for the last seven years has had a permanent

stricture. A surgeon whom he consulted, told him, that he himself, when a boy at Westminster school, had an irritation in the urethra, brought on in consequence of the effects of a blister, which lasted several years.

When once a stricture is formed in the membranous part of the canal, it produces two effects; it renders the urethra in general more irritable; and it prevents all that portion of it, between the stricture already formed and the external orifice, from being dilated to its usual extent; and consequently deprives it of its natural healthy actions. Under these circumstances it becomes more disposed to the formation of strictures.

This is so much the case, that when the original stricture, at seven inches, has been of long standing, there is almost always another formed about an inch further on, in the anterior part of the urethra, and too often a third, about three inches from the external orifice. Whenever strictures are

met with in these situations, there is reason therefore to consider them as the consequences of one which has been formed for a longer time, nearer the bladder.

SECTION V.

LOCAL SYMPTOMS OF STRICTURE.

IN the commencement of the disease, a stricture in the urethra is seldom discovered; the only symptom it produces being a diminution of the stream of urine, which cannot be ascertained, unless the patient has before attended to the natural size of that stream, which is hardly ever the case.

The disease is therefore unknown, till the expulsion of the urine is attended with difficulty, and this seldom happens till the contraction has been of some standing, and has made considerable progress; but when the mind of the patient has once taken the alarm, and the nature of the complaint is explained, he becomes enabled to recollect several circumstances, to which he had not before attended, and to trace the disease nearly to its origin.

According to information, in this manner collected, the first progress of the contraction is in general very slow; but when once it has so far increased, that the urethra is not wholly relaxed by the force of the urine, its subsequent advances are more rapid, and new symptoms are perceived. The urine is voided more frequently; does not pass without a considerable effort, attended with pain, and a straining continues after the bladder is emptied. If the patient accidentally catches cold, drinks a glass of spirituous liquor, acid beverage, or punch, commits an excess in drinking wine, or removes quickly from a warm to a cold climate, the urine will perhaps pass only in drops, or be entirely obstructed; these causes inducing, in the contracted part, a spasmodic action, by which it is closed. Cold externally applied to the body, has so great an effect upon spasmodic stricture, that a patient who can make water without the smallest difficulty in a warm room, upon attempting it in the open air, shall

be entirely unable to pass a drop ; but even under this difficulty, if he returns to a warm room, and sits some little time, the urine shall flow as before. It is a curious fact, that the symptoms of stricture are more frequently brought on when the patient is living a sedentary life than an active one ; of this I have had a variety of instances.

When these last symptoms occur, and a stricture has not been known previously to exist, the disease is not unfrequently mistaken for an inflammation on the neck of the bladder, and treated accordingly ; but the symptoms not yielding to internal medicines, and an absolute necessity arising to draw off the water, the attempt to perform that operation by a catheter, discovers their true cause.

In this stage of a stricture, it is very liable to be affected by an action of the parts, which, I believe, is very little suspected. When this happens, both the patient and surgeon are misled, and the disease is very improperly treated.

The action alluded to, is that which takes place in the membrane of the urethra during copulation, to reduce the size of the canal, and fit it for throwing out the semen with the necessary velocity; in doing which it sometimes also increases the stricture. This does not, however, often happen, unless the action of the coitus is repeated two or three times, at short intervals, or when the act itself is lengthened beyond the common period.

Under these circumstances, the membrane is kept longer in a state of contraction, and the part disposed to stricture loses the power of relaxing again; the passage is not completely closed, but very much narrowed at this part, and remains in an extremely tender state, so that it is irritated by the urine passing through it, and in a few hours a discharge of matter comes on, similar to that from gonorrhœa. In some instances, and those not a few, the contraction is so great as altogether to stop the emission of semen, and force it back

into the bladder; in others, it passes through the stricture, after the orgasm has taken place, but with little or no force.

A gentleman in the act of copulation felt, at the instant the emission should have taken place, considerable darting pain in the urethra, and found afterwards a few drops of blood upon his linen. About an hour after, he had occasion to make water, and in preparing to do so, the semen which should have been emitted, appeared upon his shirt in considerable quantity.

I was consulted upon the cause of such very unusual and distressing circumstances. On hearing them stated, I informed him that there must be a stricture in the urethra, which alone could explain what had happened. This he was inclined to doubt, as he made water very well; but upon passing a bougie an obstruction was met with, just beyond the bulb of the urethra; and upon allowing the bougie to remain, with a slight pressure against the stricture, for a few minutes, it was capable of being passed on to the bladder.

The discharge and pain in making water, brought on under the circumstances above mentioned, at a time when no previous disease is known to exist, and most commonly after a connection between the sexes, which leaves a suspicion of infection, are naturally concluded to be the symptoms of gonorrhœa: from which, however, they will be found to differ very materially. They come on a few hours after the connection; the degree of inflammation is very slight; the discharge is the first symptom, which is more violent at the commencement than at any other period. The inflammation, after remaining a few days, begins to subside, leaving nothing but the discharge, and that also frequently disappears in five or six days, whether any means are employed or not for its removal. The course of these symptoms differs so much from that which takes place in gonorrhœa, that if the attention of the surgeon is called to it, there is little danger of his being mistaken in his opinion.

The mistake is however sometimes made, and not only with impunity, but even greatly to the credit of the surgeon, raising him high in the opinion of his patient, for his skill in curing gonorrhœa; yet the mistake is sometimes attended with serious consequences; for the use of stimulating injections, with a view to stop the discharge, brings on in particular cases, a state of irritation, which is carried to an alarming height, and continues for a considerable time.

The circumstance which has in the greatest degree tended to make strictures mistaken for gonorrhœa, is that the pain in making water is confined to the same spot in both diseases, which it is impossible for patients to comprehend. They all understand the seat of gonorrhœa, and therefore naturally consider any pain in that part as a proof of gonorrhœa being present.

The fact is, that a stricture in the membranous part of the urethra does not render the part itself uncommonly sensible, but all the painful sensations are felt an inch and a

half from the orifice of the glans penis. This does not happen in particular cases, but is a general fact : whether this is to be accounted for from the nerves that are spread over the canal terminating there, or from a sympathy between the parts, I am unable at present to decide. It will, however, be rendered less surprising than it otherwise might be, when it is compared with the symptoms of stone in the bladder ; in that disease there is a burning pain in the glans penis, without any part of the canal of the urethra having much unusual sensation.

The pain in the seat of gonorrhoea is so common a symptom of stricture, that I have received several letters of consultation from the country, stating that the patient had a stricture several inches down the canal, but there was also an ulcer an inch and half down, which must be cured previous to the removal of the stricture.

This fact I consider to be so well established, that if in passing the bougie to ascertain the real state of the urethra, a great

degree of unusual tenderness is felt when the bougie passes over that part; I am, from that circumstance alone, led to conclude there is a stricture in the canal further on; and do not recollect to have met with an instance to the contrary. The following case explains the similarity of the symptoms of stricture to those of gonorrhœa.

A gentleman, seventy years old, had a connection with his own servant maid, of whom he had no cause of suspicion, respecting infection; but finding in the morning, a discharge and pain in making water, in the usual seat of gonorrhœa, he concluded it to be venereal, and applied for assistance to a surgeon, eminent in that branch of surgery, and under his treatment found himself perfectly well in a week. He now ventured upon a second connection, and in the morning had a return of his complaint: upon which he applied to me, relating all the circumstances, to know if his case could be venereal. I had little difficulty in declaring, that neither of the com-

plaints had been so, but had been occasioned by a stricture, which upon examination proved to be the case; and the stricture, although it had never been discovered, was so far advanced as to require the use of the bougie for several months, to dilate the passage to its natural size.

When the stricture is in a more advanced stage, the contraction has so established itself, that at all times the seat of the stricture is much narrower than the rest of the canal. The strictured part still, however, possesses the power of contracting and relaxing; in the contracted state, closing up the passage; in the relaxed state, allowing the urine to pass through it in a small stream. In this state the stream is so small, and the exertion necessary to empty the bladder so great, that the patient can seldom be wholly ignorant of his complaint.

The spasmodic contraction, upon any irritation being applied to the part, is very great, and acts with considerable force. This is known by the urine being unable

to pass in a stream, and a small bougie, which, in its relaxed state, met with no resistance, can now scarcely be passed through it; and, if allowed to remain for a few minutes, is not unfrequently grasped so tight by the spasmodic contraction, that when it is attempted to be withdrawn, some force is required to overcome it. The bougie, when examined, puts on an appearance exactly resembling what would have been produced if a piece of packthread had been tied round it. In this stage the spasmodic contractions, although more violent, occur less frequently than while the stricture was in a more recent state. When the stricture has been of some years standing, the bladder becomes thickened in its coats, to increase its power of expelling the urine, which is rendered more difficult by this obstruction; the bladder in this thickened state does not admit of the usual dilatation, so that the patient at all times makes water frequently, every three or four hours, if not oftener. He is unable to go through the

night without once or twice making water. An inquiry into this circumstance often leads to a knowledge of the disease. Besides the symptoms of stricture which have been taken notice of, and which occur in the more common cases of stricture, being the immediate effects of mechanical obstruction to the urine, there are others, both local and constitutional, arising from peculiarities in different patients, which are equally deserving of attention.

One very common symptom of stricture is nocturnal emissions; and I have been consulted by patients who had no other cause of complaint, neither pain in making water, nor discharge from the urethra, and upon examination by a bougie, a stricture has been met with, the removal of which has carried off this complaint. In such cases the stricture had no disposition to spasm, and the patient, while awake, was insensible of any disease; but when asleep, the diseased state of the urethra conveyed sensation to the mind, at a time when the other parts in

health did not; and the effect of this sensation was dreams respecting the actions in which those organs are usually employed.

In very irritable patients there is, in the seat of the stricture, in the membranous part of the urethra, a variety of unusual sensations, conveying to the mind the idea of something in motion; and I have been asked, "if it were possible that a maggot could have been crawling there?" Some have compared it to the fluttering of a bird. This sensation has been removed with the stricture.

In many cases of stricture there is a periodical discharge, brought on by cold, or any occasional cause; when this comes on, the inflammation extends to the bladder, the frequency of making water is very much increased, and the urine very turbid; it is voided for twelve or twenty-four hours, once an hour, or even twice in that period. This is the slightest kind of attack, and it very seldom stops there; sometimes the bladder is inflamed in a greater degree, and

secretes from its inner membrane matter or pus, which passes out after the urine. When the irritation on the bladder is prolonged, or the attack more violent, the discharge from the internal membrane is glary, and like the white of an egg; it is so adhesive, that after it has stood some time in the pot, it is scarcely possible to separate it.

This discharge of pus and gelatinous mucus, have been considered as the symptoms of an ulcer, or a calculus in the bladder; they are, however, by no means peculiar to such causes; they arise from any irritation in the bladder, and are met with very frequently in cases of strictures of long standing. When the bladder is attacked in this way, from stricture, the urine loses its natural smell, and acquires a peculiar flavour; it is a faint smell, in a slight degree similar to the odour communicated to the urine from eating asparagus. This is often a first symptom of the attack, coming on some days before the discharge from the bladder takes place.

These symptoms, when they increase to a very great degree, bring on inflammation upon the peritonæum lining the abdomen, and the patient is carried off.

In two cases I have seen this take place. As there is no immediate communication between the bladder and abdomen, this effect must arise from sympathy.

A stricture in this state, as it impedes the passage of the urine every time an attempt is made to evacuate it, increases also the action of the bladder, in proportion to this resistance. A constant irritation is thus kept up in the stricture, by which it acquires a stronger disposition to contract; in this way the canal is gradually diminished, and, in some uncommon cases, is rendered impervious at that part.

As the evacuation of urine is necessary for carrying on the functions of life, this last stage, or complete obstruction, cannot take place without destroying the patient, unless another outlet is formed; complete strictures are, therefore, only met with

where fistulæ in perinæo have previously been produced. By their means an artificial passage is formed for the urine; but it is in general so imperfect, as only to diminish, and not to remove, the irritation at the stricture.

SECTION VI.

CONSTITUTIONAL SYMPTOMS OF STRICTURE.

As a stricture is entirely a local disease, it may not appear capable of producing particular effects on the constitution, and it is natural to suppose, that any derangement of the general system which occurs is only accidental, not immediately connected with the local complaint. We find, however, in practice, that there are constitutional symptoms which very frequently take place in this disease, and these are no longer met with after the stricture is removed.

The most common symptom of this kind is a complete paroxysm of fever; the rigor, or cold fit is extremely severe, agitating the whole body, and shaking the bed upon which the patient is laid with great violence; this is followed by a hot fit, and afterwards a very profuse perspiration breaks

out, the sweat is so profuse as to require several changes of linen before it goes off; the shivering lasts from fifteen minutes to an hour; the hot fit continues sometimes several hours, and the perspiration is also two or three hours before it ceases.

It very often happens that the first paroxysm is imperfect, and in the course of a few hours it is followed by a much more violent one, which completes the attack; so that, when the sweating fit of the first paroxysm is very copious, there is seldom a second; but if it is not, there will most commonly be another. In some instances the shivering is not accompanied with the sensation of cold. Sickness and retching generally take place in the cold fit. During this paroxysm, when the most severe, there is a frequency in making water, but seldom a strangury.

This attack differs from common ague, in the violence of the perspiration, which is in general much beyond what is met with

in agues ; the fits do not return at the same periods, and seldom more than twice.

This symptom is exceedingly common in warm climates, as in the East Indies, the West Indies, and Spain ; but very rarely occurs in patients who have resided entirely in cold climates, although it is sometimes to be met with.

In those climates, when it has occurred, attended with frequency in making water, the constitutional affection has always been considered as the primary disease, and the irritable state of the bladder only as a symptom. I have had a patient under my care, who for three years had this constitutional symptom of stricture, in the West Indies, which was treated in that country as an irregular ague. But not finding himself relieved, he came to this country ; and it was discovered that he had strictures in the urethra, upon the removal of which, the ague disappeared, without the use of any internal medicine.

This symptom is brought on by exposure to cold, more than by any other cause; it may, however, be produced by any other act of imprudence, as excess of fatigue, or eating and drinking so as to disorder the bowels. It is also an effect of passing a bougie, or applying the caustic.

This rigor, which so commonly occurs in cases of strictures of long standing, appears to arise from a sympathetic connection between the bladder and stomach; and, in some instances, the stomach alone is affected, without producing the rigor, and the patient has sickness and vomiting. In one instance this was mistaken for a symptom of gout; there had been several different attacks of this kind, one every two or three months, and the last, which was the most violent, brought on inflammation upon the bowels, and the patient died.

In particular people, more especially those who have been in warm climates, strictures produce an irritable uneasy state of stomach; this, in one case, came on

every night on going to bed, and continued several hours. It returned in this way for twelve years, and, upon the stricture being removed, went off. This state of stomach is accompanied with a degree of general irritation, quick pulse, loss of appetite, white tongue, thirst, heat on the skin, and restlessness, both at the time, and for some hours after the attack in the stomach goes off. In several cases, this state of irritation occurs without the stomach being particularly affected: it has been mistaken for nervous fever, and treated as such for a considerable time, without benefit; but upon removing the stricture it went off.

Inflammation of the tonsils and fauces, in two instances, came on periodically, at the times when the bladder was in a state of irritation, and went off when it returned to its easy state. One of these attacks was suspected to be venereal; but it went away altogether upon the removal of the stricture.

CHAPTER II.

OF DISEASES WHOSE SYMPTOMS RESEMBLE
THOSE OF STRICTURE.

As some of the symptoms of stricture are situated in the canal of the urethra, others in the bladder, any disease which affects either of these parts, may produce symptoms in some respects similar to those of stricture, and mislead the judgment of the surgeon. To render these mistakes less frequent, I propose to consider those diseases whose symptoms bear the greatest resemblance to strictures, and to point out the means by which they may be distinguished. An irritable state of the urethra, and an irritable state of the bladder, are of this kind. Diseased enlargement of the prostate gland is often mistaken for stricture; but, on the other hand, strictures are much more commonly mistaken for affections of the prostate gland; on both

these accounts it becomes necessary to explain the peculiar symptoms of each.

The stone, as it produces an irritable state of the bladder and urethra, has symptoms in common with strictures; but there are, at the same time, many peculiar to the stone, and any doubt that may arise can be removed by sounding the bladder. I shall, therefore, consider it as unnecessary to say any thing upon that disease.

Ulcers in the urethra, and caruncles, were, till very lately, generally considered as causes of obstruction, and capable of producing all the symptoms of stricture. This opinion, I find, is still supported by many practitioners: I shall therefore make some observations upon these supposed impediments to the urine.

SECTION I.

OF THE SYMPTOMS OF AN IRRITABLE STATE
OF THE URETHRA.

THE membrane of the urethra is upon many occasions liable to have its natural actions disturbed, and rendered irregular; when this happens to any particular part, it is in many patients communicated over the whole canal: this sometimes follows upon the discharge being checked in the early stage of gonorrhœa, by means of irritating injections, and lasts for weeks; at the end of which period, there is little or no abatement; afterwards it may perhaps quite suddenly go off. This, though it differs in many respects from the common effects of inflammation, and does not give the same kind of pain to the patient, may be considered as a slighter degree of inflammation.

The readiness with which the natural actions of the membrane of the urethra are disturbed by slight causes, will be best understood by stating the effect produced on that canal by the influence of the mind.

If a person of much sensibility has had a suspicious connection, as sometimes happens, while in a state of intoxication, upon coming to his recollection of the past, he takes the alarm of having received an infection; the state of mind sometimes actually produces a number of painful sensations, and shooting pains in the membrane of the urethra; all which go off as soon as the time is elapsed in which he can suspect any danger of gonorrhœa.

This effect is so common, that multitudes must have experienced something like it; but the degree is ever proportioned to the state of mind. In one instance of a young gentleman, whose situation was of a delicate nature, and whose feelings led him to consider that his being discovered to have such a complaint might be absolute ruin to all

his future prospects, the symptoms that were brought on by his apprehension were so violent, as to deprive him of rest for several nights; not from mental reflections only, but from the painful sensations in the urethra, attended with fever; all which were abated by opium. The truth was, that no infection had been communicated, and in a little time the alarming symptoms altogether ceased.

This irritable state of the canal when it is the consequence of gonorrhœa, in many instances produces all the symptoms of stricture. There is a discharge of matter, a pain in making water, an irritation in emitting the semen, and the urine passes with difficulty, and only in a small stream.

The difficulty in this case differs from that met with in stricture; for although there is some exertion required, and the stream is small when the water begins to flow, the difficulty gradually decreases, and the stream becomes larger before one half of the urine has been evacuated, and afterwards is as

large as it naturally is, which does not happen in cases of stricture.

These symptoms occasionally abate, and even go off, but after connection with women, return again; so that the history of the symptoms may correspond with those of strictures, and nothing but an examination by the bougie can distinguish them; and still if the examination be imprudently made, it may confirm the deception.

I have been very frequently consulted by patients on account of symptoms not in the least suspected to arise from stricture; and when the nature of the disease was ascertained by examination, they have expressed their astonishment at what appeared to them so extraordinary a discovery.

On the other hand, I have, in a variety of instances, been consulted by patients, whose complaints had been previously decided upon as strictures; and yet upon examination they proved only to be irritable urethras. Some of the most remarkable cases of this last kind I shall mention at length.

CASE I.

Irritable Urethra mistaken for Stricture.

A gentleman who consulted me for some symptoms supposed to arise from stricture, confessed that he had, from a boy, a great sensibility in the lining of the urethra, which he thought was natural, and therefore had taken no notice of it, till after a gonorrhœa, when it had so much increased as to give him considerable alarm, and had never afterwards gone entirely off. He had occasionally a discharge like a gleet, always a small stream of urine, often a frequency in making it; and these symptoms were brought on or increased after having connection with women. Upon passing a full sized bougie, the canal was found of the natural size, but in a very irritable state.

CASE II.

Irritable Urethra mistaken for Stricture.

A gentleman with an irritable urethra, consulted his surgeon on account of the following symptoms; a discharge from the urethra, and pain in making water. A bougie of a small size was passed, which met with an obstruction at six inches from the external orifice; this was considered by the surgeon as a stricture, and the use of the caustic was recommended. The gentleman was a little afraid of this mode of treatment, and wished to consult me before it was adopted. I passed a full sized bougie, which went readily into the bladder. By this circumstance it was discovered that the former bougie, from the smallness of its point, had stopped at the curve of the canal, and led to the opinion of there being a stricture; which had nearly been productive of a very improper mode of treatment.

CASE III.

Irritable Urethra mistaken for Stricture.

A gentleman who had a deficiency in his powers with respect to women, at an earlier age than he thought he had reason to experience it, consulted a surgeon of character ; who passed a small bougie, and met with an obstruction at the curve of the urethra. He explained to the patient that the complaint was a stricture, and put him on a course of bougies ; which the patient passed himself daily for three months without benefit, not being able to get into the bladder. The patient had heard of the treatment by caustic, and mentioned it to his surgeon, who declined adopting it, which induced him to consult me. That I might make myself master of the case, I passed a full sized bougie, of a very soft composition, which stopped at the curve of the urethra ; and when it was withdrawn, the end had a

fairly rounded appearance, except on the lower surface, which had a small projection, not thicker than a knitting needle, that appeared to have gone for one tenth of an inch into a hole. This led me to believe that there was no stricture; but that the point of the small bougie had been stopped by some little irregularity, and by repeated applications, had made a way through the internal membrane. To ascertain the true state of the parts, I passed a flexible gum catheter of the full size, with a stilet which had previously the curve of the canal given to it, so that the end might not be caught upon any irregularity on the lower surface of the urethra.* This instrument went without any obstruction into the bladder, and the water passed through it.

In this way it was ascertained that there was not the smallest obstruction in the urethra, only an irregularity on the lower surface; and upon inquiry I found he re-

* See Plate II. which represents the curve of the urethra.

tained his water during the whole night, made it in a full stream, and had no irritation in the canal, but what came from the use of the bougie.

His only complaint was a diminution of his powers respecting women, which he had attributed, without reason, to a complaint in the urethra.

CASE IV.

Irritable Urethra mistaken for Stricture.

A gentleman twenty-three years of age, while living in the country, had an irritation in the urethra, and the urine passed in a small stream. The surgeon who was consulted introduced a small catgut bougie, which went along with difficulty, and stopped at the neck of the bladder. From this examination it was decided that he had a stricture, if not several, and an enlarged prostate gland.

This, to a very nervous man, increased all

the symptoms, and he came to London to consult me. In stating his case, he mentioned the small stream of urine, inability to pass the semen, and pain and uneasiness in the perinæum. I introduced a full sized bougie, which passed with ease into the bladder. This proved that there was no stricture, and no enlargement of the prostate gland, as the canal at that part had its usual curve. The whole of the complaints had their origin, I believe, in the piles; which in this particular instance had brought on considerable irritation upon all the neighbouring parts, but particularly the urethra.—After this explanation he had a connection, and found the semen was emitted without irritation or difficulty; so that a great part of the symptoms appeared to be brought on merely by agitation of mind.

SECTION II.

OF THE SYMPTOMS OF AN IRRITABLE STATE
OF THE BLADDER.

THERE is such a connection between the bladder and the urethra, they sympathize so readily with each other, in their natural actions, and the diseases of the one have so great an influence upon the other, that there is scarcely any complaint to which the urethra is liable, that does not more or less derange the functions of the bladder ; and on the other hand, the diseases of the bladder produce uneasy sensations and morbid actions in the urethra.

The bladder is not only rendered irritable by strictures in the urethra, diseases of the prostate gland, and calculous concretions contained within its cavity, but it is very frequently diseased without any apparent connection with these causes ; and as the

irritable state of the inner membrane of that viscus must produce in some measure the same symptoms, in whatever way it is brought on, it will require some discernment to distinguish this complaint from strictures.

The diseased state of the inner membrane of the bladder, by producing spasmodic actions in the urethra, may be mistaken for stricture; and this mistake is by no means uncommon in practice.

The disease of the bladder which most commonly occurs, is a thickening of its coats; the muscular coat does not relax, or admit of the usual extension, and consequently the inner membrane is thrown into rugæ; these are also thickened, and have not their natural, soft and membranous texture; they are at the same time extremely sensible to any pressure that is made upon them.

Whether the disease originates in the muscular coat or internal membrane it may be difficult to determine; it is, how-

ever, most probably in the inner membrane, which from its situation is much exposed to irritation, and upon many occasions liable to inflammation.

This inflammation of the internal membrane of the bladder may take place from any irritating substance passing into its cavity, or it may arise from the urethra, by contiguity of parts; I believe it does not unfrequently happen in both ways, and when it has once taken place, it leaves that viscus liable to future attacks, from much slighter causes than were necessary to bring it on at first.

In many instances of severe gonorrhoea, the inflammation is found to extend to the bladder, and to produce a great degree of irritation for a considerable time. It sometimes does occur from the effects of injection, and I believe oftener than we are willing to believe. The following case is an instance of this kind.

CASE I.

Irritable Bladder from the Use of Injection.

A gentleman, thirty-four years of age, had a gonorrhœa six months ago; for which complaint he made use of an injection, with the composition of which he was unacquainted; it stopped the discharge for which it was employed, but almost immediately brought on an irritation upon the bladder, which has continued ever since. The attacks are periodical, with short intervals; sometimes of a week, at others only a few days. The symptoms are an uneasy feel in the region of the bladder, extending at times into the neighbouring parts, but principally felt directly behind the os pubis. A pain runs along the urethra to the glans, and in that part is very severe. There is a straining after making water, attended with pain, which goes off in a few minutes. In the urine there are small portions of coagulating lymph in the form

of flakes and threads. The urine is voided more frequently than in health. These symptoms for the first three months were very severe, they are now less violent, and appear to be gradually going off.

When I first saw him, two months ago, a full sized bougie passed readily into the bladder, and he had been sounded by another surgeon, who had felt nothing hard in the bladder. From this investigation it could neither be stricture nor stone that caused the irritation. The prostate gland is in a natural state; so that the disease must be confined to the inner coat of the bladder, which had suffered so much from the irritating effects of the injection, as to be inflamed and to produce all the symptoms that have been mentioned.

Similar effects of an injection, but in a much more violent degree, are taken notice of in the 9d section of the 5th chapter of this work, in a case of stone adhering to the bladder.

CASE II.

Irritable Bladder from Injection.

A gentleman twenty-six years of age, in September, 1786, immediately after having returned from India, caught a gonorrhoea, which was treated in the common way, by using an injection of saccharum saturni diluted in water. The discharge suddenly disappeared three days after this treatment was commenced, and a violent pain was felt in the perinaeum, a frequency in making water came on, with a violent spasmodic affection of the sphincter vesicae, and in the rectum. These symptoms increased to a most insufferable degree; opiates were employed, both in clyster and by the mouth; but although above a dram was administered by the anus, and two grains of the extract of opium by the mouth, every four hours, it seemed to have no effect on the spasms, or the irritability of the bladder, which continued with nearly equal

violence ; warm applications in the form of bladders filled with water, flannel, fomentations, and poultices were tried in vain. Musk in doses of one scruple every four hours gave no relief, although continued two days ; after which camphor was tried. During this time the patient could not retain his urine above ten or fifteen minutes ; when the urine came away the pain in the glans penis was violent : this seemed to be a little alleviated by immersion in hot water. The irritation in the bladder brought on an increased secretion of mucus, which followed the urine ; the camphor julep seemed to make the spasms less frequent ; but whether that was really the case could not be ascertained, as after two days continuance the symptoms were equally violent. At this time the complaint was of a fortnight's standing : a bougie was now passed for some inches up the urethra, but this produced no effect : it was then tried covered with oil and one fourth part balsam copaiva ; this gave a little pain in the glans, but different

from that brought on by the complaint : it continued for some time after the bougie was withdrawn, and next day a discharge of matter from the urethra came on, and he found himself easier. In a few days he got well.

SECTION III.

OF THE SYMPTOMS OF A DISEASED STATE OF
THE PROSTATE GLAND.

THE prostate gland, when enlarged, projects into the neck of the bladder and obstructs the urine in its passage.—This complaint, when examined in the dead body, is more obvious than stricture, and has been therefore more generally known, and better understood.

As the seat of stricture and obstruction from an enlargement of the prostate gland are not the same, it would appear difficult to confound the two diseases, where the parts have been examined by a bougie ; and yet, from want of an accurate knowledge of those parts, this is very often done. The length of the canal is by no means accurately known to many practitioners, nor has it been believed that strictures are met

with beyond the bulb of the urethra. Any obstruction which the bougie or catheter meets with, lower down in the urethra than the curve, is therefore supposed to be an enlargement of the prostate gland.

I should not have ventured to make this remark, from having found it to be true in a few instances ; but I have known the mistake to be made in so great a variety of cases, that I think it of importance that it should be corrected.

The prostate gland has been accused, very unjustly, as the cause of many distressing symptoms of irritation, which are really brought on by strictures. It has been considered as a very sensible part, and the least violence committed upon it has been supposed capable of producing stoppage of urine, with every circumstance of aggravation that can attend that distressing complaint.

This opinion, when combined with the idea that every stoppage beyond the bulb is produced by an enlargement of the pro-

state gland, has been productive of alarms in the mind of many surgeons, which have prevented them from administering relief to their patients in cases that would have admitted of it.

The prostate gland, when it enlarges and brings on a stoppage of urine, certainly does produce the same distressing symptoms which must always attend an equal degree of suppression from any other cause; but as soon as the bladder is emptied, they go off, not being kept up by any preternatural sensibility of the prostate gland.

So little has the sensibility of the prostate gland to do with these symptoms, that in many instances it has been perforated by the end of the catheter, in attempting to draw off the water, and this accident has brought on no symptoms whatever; it has not even been discovered till after death, that such an accident had happened. Of this fact I shall adduce two instances.

CASE I.

A gentleman, aged sixty-six, had an enlargement of the prostate gland, and in consequence of it, a suppression of urine; several ineffectual attempts were made to draw off the water, and it was proposed to puncture the bladder. While the instruments were preparing for that purpose, I made one more attempt with the flexible gum catheter, made firm by means of a stilet, assisting it by a finger in the rectum. The catheter went on into the bladder, and the urine flowed; it was therefore supposed to have taken the right course. The patient was relieved, and the catheter was afterwards passed several times; but it always required to be guided in the same manner. From the diseased state of the bladder, it was subject to violent spasms and irritation, and in seventeen days the patient died.

Upon examining the body after death, it

appeared that the end of the catheter had forced a way for itself through the prostate gland into the bladder, making an artificial canal; this had not brought on inflammation or thickening of the surrounding parts, and the hole was covered with a membrane, like any fistulous orifice of long standing.

CASE II.

A gentleman, sixty-five years old, travelling in a post-chaise, was so circumstanced as to be prevented for several hours from making water; and when he attempted it, none would pass. The common means in cases of strangury were made use of, but it was found necessary to pass a catheter. The want of power to expel the urine without the use of the catheter continued, and he was obliged to have the water drawn off till his death, which was five years. The instrument was found for the first year to

pass with much difficulty. It was therefore left in, and only changed occasionally. This was attended with some difficulty, requiring the instrument to have a particular curve to carry it, as was supposed, over the point of the prostate gland.

In the course of time its passage became more easy, and the bladder much freer from irritation, but still no water passed when the catheter was withdrawn. This complaint was not the cause of his death, which was the consequence of an affection of the bowels.

Upon examining the parts after death, the prostate gland was found much enlarged, firm, and solid in its texture, and projecting into the bladder, with an appearance not unlike an *os tincae*; and what is to the present purpose, in the lower part was a round hole large enough to admit the catheter, through which that instrument had been passed for five years. It was rounded off at the edges like a natural opening. The bladder was nearly in a healthy state.

These instances are sufficient to prove that the prostate gland is not always sensible when injured, nor does it suffer materially from accidental violence.

Diseases of the prostate gland are not nearly so common as they are generally believed, and very seldom occur but at an advanced age; in this they differ from strictures, which come on too often in the prime of life.

It has been believed, and it was a very natural idea, that strictures bring on diseases of the prostate gland; but in several hundred instances of stricture that have come under my care, I have only met with three or four cases of enlargement of this gland, and two of these cases in men above sixty years of age; from which I may fairly conclude, that they seldom occur in the same person, which they must have done, if strictures produced an enlargement of the prostate gland.

The reverse of this position I believe to be true. A disease in the prostate gland

as it diminishes the stream of urine, and irritates the bladder, can and does affect the urethra, so as to bring on stricture; but since diseases of that gland usually happen late in life, instances of this kind do not become frequent.

A stricture may be distinguished from an enlargement of the prostate gland in the following manner:

The distance of the obstruction from the external orifice is to be determined by passing a soft bougie, which is to be left in the canal for a minute, so as to receive an impression from the obstruction. If the bougie does not pass further than seven inches, and the end is marked by an orifice of a circular form (it is immaterial as to the size of the orifice), the disease is certainly a stricture; but if it passes further on, and the end is blunted, a disease in the prostate gland is to be suspected. This in general can be ascertained by a flexible gum catheter with a stilet, very much curved, passing into the bladder,

which it will do in most cases of enlargement of the gland.

The prostate gland in its enlargement does not diminish the size of the passage into the bladder, but rather increases it. The lateral portions of the gland as they swell, widen the passage between them, rendering it of an oval form; it is therefore the projecting portion from the lower part which prevents the urine from flowing, and obstructs an instrument in its passage into the bladder. The obstruction in some instance arises from the two sides of the gland enlarging unequally; the larger portion pressing against the smaller, which is made hollow to receive it, so that the passage winds round the projecting part, and this winding cannot be followed by an instrument.

SECTION IV.

OF THE SYMPTOMS SUPPOSED TO ARISE FROM
CARUNCLES IN THE URETHRA.

IT is proper to mention that there are still many surgeons of eminence who retain the opinion, that other causes of obstruction to the passage of urine often occur, which are mistaken for strictures. These are caruncles or excrescences from the membrane of the urethra, and venereal ulcers in different parts of the canal.

To say that such affections of this membrane seldom take place, may appear to some a rash position ; I need only mention that I never have met with them ; and were they of frequent occurrence, I must have been peculiarly unfortunate to miss them, having had more than common opportunities of inspecting the appearances of these diseases in the dead body.

There is a circumstance attending all strictures of long standing, which I have already endeavoured to explain, and which may have given rise to the opinion of caruncles existing in the passage. The circumstance I allude to is that of the anterior part of the urethra becoming irregularly contracted; and so irritable, that any attempt to pass a bougie brings on a spasmodic increase of this contraction.

When this is the case, a small bougie conveys the sensation of passing over little eminences, or forcing its way through soft parts that obstructed it; and when this is attended with hæmorrhage, the idea of having broken down some fungous excrescence is very much strengthened; while, in fact, all these impediments arise from the irregular contraction and irritable state of the membrane; and when the canal is a little more dilated, they are no longer to be met with.

The idea of ulcers and caruncles in the urethra has been so very general, that I

have been led to trace the origin of this opinion, and I think I can explain the foundation upon which this erroneous doctrine has been established.

When gonorrhœa was first introduced into Europe, the discharge from that disease was believed to arise from ulcers upon the inner membrane of the urethra ; as it was not at that time known that any surface could form matter, without being previously in the state of ulceration. All the symptoms of obstruction in the urethra were found to come on frequently, soon after the cure of gonorrhœa, and in general had been preceded by that disease, although at very different periods of time ; the obstructions were therefore naturally referred to the ulcers formed in the time of the gonorrhœa. When they were attended by discharge, they were supposed to arise from the thickened edges of the ulcers filling up the canal ; and when the parts bled upon being touched by an instrument, this was considered as an excrescence from the ulcer. If the

obstruction was unaccompanied by discharge, it was conceived that the ulcers were healed, but the contraction of the cicatrix had become callous.

This theory, in its full extent, was generally believed, till Petit and several other surgeons of eminence, as Dionis and M. De la Faye, found, upon opening patients who had died while labouring under obstructions in the urethra, that there were no caruncles, but an appearance which they considered as the cicatrices of the ulcers formed in gonorrhœa.

Monsieur Duran, when he introduced into use his suppurating bougies, probably from a belief of the old doctrine, insisted on the presence of caruncles ; of which he has given no other proof, than that he knew them by the feel which they gave to his bougie ; which when applied brought them into a state of suppuration, and destroyed them.

Some years after this, it was discovered that secreting membranes, of which the lining of the urethra is one, are capable

of producing a discharge, without a breach of their substance ; this doctrine was published by Mr. Sharpe, in his *Critical Inquiries*. But although he takes much pains to prove it, he does not venture to deny the existence of either ulcers or caruncles, but assents to the doctrine of Duran, and believes that they arise from both these causes. At the same time he says they also arise from a simple tightness in the canal, especially where they occur, as they sometimes do, without being preceded by gonorrhœa. He considers gonorrhœa as a discharge from the surface of the membrane, and the ulcerated orifices of the lacunæ. He mentions instances of caruncles and ulcers near the verumontanum.

Since the time of Mr. Sharpe, it has been ascertained by Mr. Hunter, that in gonorrhœa there is not necessarily any ulceration, and that it is rarely if ever to be met with in that disease ; that the seat of gonorrhœa is in one part of the canal, the more usual seat of stricture is in another,

at several inches distance. These facts being established upon the most solid ground, namely, that of actual observations made in a great variety of cases, the whole theory of ulcers and caruncles must be erroneous.

Ulcers have, however, been found by Sharpe, and something like caruncles; ulcers have also been met with by others, and almost always at the verumontanum. These have only been noticed in the worst cases, where the patients have died from the violence of the obstruction. Such appearances are still met with, but they are now known not to be the cause of stricture, but a consequence of it, and an effort of nature to relieve the bladder, by giving a passage to the urine behind the stricture, by means of ulceration, which, when effected, is called a fistula in perinæo.

In proof of the truth of these remarks, and to shew how the mind is misled by previous theory, if any one will take the trouble to compare Duran's cases with those mentioned in this treatise, he will find that

they correspond in the number and situation of the obstructions, and only differ in the names given to them. Duran calls the first a caruncle, the second a callosity, and the third an ulcer; the last being the worst, and always at the verumontanum; or he found three or four ulcers, in the same relative situations.

I describe the same number of obstructions, and the last always the worst. The whole of them, in every instance that I have examined in the dead body, have proved to be thickened contractions of the internal membrane; and the cases of stricture I have treated in the living body, from the impressions they made on the bougie, during the progress of the effects of the caustic, prove that they are of the same nature.

I have stated that the seat of the last stricture is near the neck of the bladder, a part of the canal most subject to this disease; that the others are only secondary strictures, in consequence of the urethra being, by this obstruction, deprived of

its natural dilatation ; and the ulcer with thickened edges, mentioned by Duran, the disease which required so long a continuance of the application of bougies, is exactly in the same situation, so that there can be no doubt of the obstructions so differently described being the same.

Where the patient dies from the effects of stricture, the symptoms are almost always so violent, that ulceration takes place between the stricture and the bladder some days before death. This appearance, when cursorily examined, may readily be mistaken for the original disease : and is the ulcer described by Duran ; but more frequently supposed than actually found.

It is proper to mention that the membrane of the urethra, like the membrane of the mouth, is not disposed to throw out fungous excrescences, after ulceration has taken place on its surface, but readily skins over.

CHAPTER III.

OF THE TREATMENT OF STRICTURES.

IN the foregoing account, I have noticed the symptoms and appearances which occur in the different stages of strictures, so far as they are necessary to assist us in our treatment of the disease, by means of local applications.

The applications made use of for the removal of strictures are employed with two different intentions: to bring back the contracted part to its original state, by dilating it; or to destroy it.

For the first of these intentions, the bougie is the instrument in general use. For the second, besides the bougie, the application of lunar caustic is also recommended.

It has hitherto been thought adviseable to have recourse to this last mode, only

where a bougie cannot be passed through the stricture ; and in all other cases to attempt the cure by dilatation.

As these observations will be confined entirely to the treatment of those strictures which admit a small bougie to pass into the bladder, it will be necessary, before any other mode of treatment is proposed, to consider whether that instrument is, in such cases, always capable of effecting a cure ; and what are the disadvantages attending its use ; after which I shall recommend the caustic, and give my reasons for preferring it, in many cases, to the bougie ; both as less painful in the application, and more permanent in its effects.

SECTION I.

OF THE USE OF THE BOUGIE.

THE bougie has long been in common use among surgeons, for the cure of strictures ; and all other means have been generally considered as very inferior in their effects.

In the early stages of the disease, where the membrane of the urethra is not in a very irritable state, recourse is had to the bougie with every advantage ; and if the stricture admits of dilatation, and allows the constricted part in a few weeks to be enlarged to the common size of the canal, a cure may be effected. But as the dilatation only overcomes the effect, the same disposition which induced the first contraction may bring back the complaint ; and a second, third, and fourth time, recourse to the same mode of treatment may be required.

From this circumstance of the return of strictures, after they have been dilated by the bougie, which too frequently happens, several physicians, some of them very high in the profession, have been led to condemn bougies altogether; conceiving that they cannot effect a cure, and by their application to the internal membrane of the urethra are injurious.*

* A physician in London carried his prejudice against bougies to so great an height, that he left a legacy at his death to a particular friend, upon the sole condition that he would never use a bougie for the cure of a stricture, with which the Doctor knew him to be troubled. The friend complied with the dying request of this physician: and afterwards died in the greatest misery, from the effects of a single stricture, which might have been palliated for several years by the use of bougies. In this case it was found after death that the urine, prevented by the stricture from coming forwards, had forced its way backwards into the intestine, instead of coming through the perinæum; and the first symptom that gave alarm was that of the fæces coming through the penis with the urine. It is the only case of that kind I ever met with, and is an instance of the most deplorable effects that stricture can produce.

Whatever objections may be made to the use of the bougie, its effects are certainly more salutary than those of internal medicines. No internal medicine appears capable of stopping the progress of a stricture, much less of producing even a temporary cure; and these objects are evidently gained by the bougie.

The injury which the urethra is supposed to receive from a bougie being long applied to it, I consider as entirely a deception. We have no fair opportunity of determining this in cases of stricture, because a diseased state of the canal when met with, may with more propriety be attributed to the stricture, than to the application; I am therefore unwilling to admit conclusions drawn from such cases, as it is the healthy membrane, not the diseased, which the bougie is supposed to injure. The information we receive upon this subject from cases of diseased prostate gland, where the urethra is in a more natural state, will be less objectionable; and in one instance, a

flexible gum catheter, which is a harder instrument than a bougie, was in constant use for five years; nor was it removed in all that period for more than a few hours at a time.

When the parts were examined after death, the membrane was found in a natural state. I could adduce, were it necessary, several facts of a similar nature; but none where the application had been so long continued.

When the bougie brings on irritation, which it often does, I believe it will be found that this effect does not arise from any injury done to the healthy membrane, but from the strictured part being kept in an uneasy state while stretched by the bougie; which brings on spasm, first upon the stricture, and afterwards upon the rest of the canal, and sometimes even upon the bladder itself.

As the bougie is required only to act mechanically as a wedge, its most important properties are, smoothness to allow it to

pass through the stricture with all possible facility, and softness, to allow of its remaining there without bringing on irritation.

With respect to the use of the bougie, two points are principally worthy attention, the one is, that its size be gradually enlarged, till it has dilated the stricture as nearly as possible to the full size of the passage; the other, that when this effect has been produced, its use should be continued for some time, to destroy, as much as possible, the acquired disposition of the part to contract.

If the former caution be not observed, this part of the canal, being still narrower than the rest, must be more pressed upon by the urine, and cannot acquire its natural easy state, but suffers a repeated irritation, which is likely to bring back the stricture; whereas, if the seat of the stricture is brought upon a plane with the general surface, the urine in its passage will tend to keep it dilated, and thus establish a cure.

The necessity of removing the cause, as

well as the effect of a diseased state, sufficiently evinces the second rule.

Were we always consulted in the early stages of a stricture, the bougie would be liable to only one objection, that of not producing a permanent cure; but partly from ignorance of the nature of the complaint, and partly from an unwillingness to expose any defects in these parts, till it cannot be avoided, the surgeon is seldom applied to, till a considerable progress of the disease has made it less within the power of the bougie to give relief.

When the stricture to be removed is of some years standing, which must be always the case when it has originated in the East Indies, it does not admit of being readily dilated, nor does it bear, for any length of time, the application of the bougie. Any attempt to render the dilatation more rapid, or to continue the use of the bougie beyond the time in which it lies quiet in the urethra, brings on too frequently spasm, strangury, and abscess in perinæo. These symptoms

sometimes appear singly; but I have more than once met with them all, in the same patient. In these cases the bougie will not do more than prevent the increase of the complaint, since it cannot be persevered in so as to effect a cure.

Where there are several strictures in the same urethra, there must be more than common irritability in the membrane lining that canal, which is a circumstance unfavourable to the use of the bougie; and in such cases we find the common bougie cannot be retained even for a few minutes; while those of a milder kind can be kept in without pain for an hour. Bougies which have preparations of lead in their composition, have an advantage here; but when made of wax and oil simply, they answer better than when made of harder materials.

In such cases, the number of strictures, and the irritability of the passage, make it almost impossible to succeed in dilating them with the bougie; the time required to overcome all the obstructions being longer than

the urethra can admit of its application, without being irritated by it; and till the last stricture, or that nearest the bladder, is dilated, there can be little abatement of the symptoms.

In consequence of these disadvantages, strictures of long standing become very unfavourable for the use of the bougie, and are only palliated by it, not cured. By perseverance for months, a bougie, about one half the size of the canal, is made to pass easily into the bladder; but all attempts to introduce one of a larger size are vain. The patient in this state makes water without difficulty; but if the bougie is left off, in less than two months the contraction, which had never been wholly removed, begins to increase, and requires again to be dilated.

SECTION II.

THE MODE OF APPLYING THE CAUSTIC TO
STRICTURES.

If the bougie is found inadequate to the cure of stricture, in many cases, where it can be passed through the contracted part, it will be readily admitted, that the chance of success in those cases where it cannot go beyond the stricture must be still less. It has been recommended to press the bougie against the stricture, and by producing ulceration, to remove the disease.

This may have succeeded in particular instances ; these, however, I am convinced are not many in number ; and the danger of making a false passage, forms a strong argument against this mode of practice.

This is carried still further by some surgeons, who make use of a silver catheter, to increase the pressure, and more effec-

tually produce ulceration. Where this practice does not succeed, it appears to do harm, by disposing the parts to become still more callous, and thus to increase the disease it was meant to remove.

In those cases that are wholly impervious, or where the orifice is so small that the end of the bougie cannot be made to pass through, Mr. Hunter proposed to enlarge it by the effects of the caustic. He was led to this idea from the appearance of the disease, when examined after death; the thinness of the membrane forming the obstruction, made it highly probable that a few touches with the lunar caustic would destroy it. The success attending this practice, and the instrument he made use of to convey the caustic to the stricture, are in the hands of the public. But as that mode has been since found capable of great improvement, I shall mention some objections to it, and explain the mode he afterwards adopted and used for several years before his death.

The instruments Mr. Hunter made use

of for passing the caustic, consisted of a silver canula, and a stilet; one end of the stilet had a small bulb, that filled up the end of the canula, and made it pass more easily down to the stricture; the other end was a portcrayon, that contained the piece of caustic to be passed down through the canula, and applied to the stricture as long as might be thought necessary: the portcrayon then being guarded within the canula, the whole was withdrawn.*

* This idea had been taken up an hundred years ago, for Wiseman says, when the obstruction is a caruncle, and you cannot pass it, you may well conclude it is callos: "In which case you may pass a canula into the urethra to that caruncle, and whilst you hold it there steady, you may convey a grain of caustic into the canula, and press the caustic to it; and whilst you hold it there, you will perceive its operation, by the pressing forward of the canula." He does not say this is the common practice, or his own particular mode, nor does he give an instance in which it had been tried.

[This observation of Wiseman's, Mr. Hunter was not acquainted with; he would not have passed that author in silence, had he known that the idea of applying the caustic originated with him.

This method was found in practice to be liable to many objections. The silver canula could not be adapted to the flexible canal of the urethra, through which it was to pass; when, therefore, the caustic was applied, and any degree of pressure made use of, the effect of the caustic was necessarily produced upon the angle between the stricture and the side of the urethra, and not in the middle of the stricture, the part intended to be destroyed.

In consequence of being thus applied, the side of the urethra was liable to be injured; and where that did not happen, the orifice made in the stricture was often oblique, and could not be followed by the bougie; so that the effect of the caustic on the stricture was only to be judged of by the increased stream of urine, as the bougie could not pass, either to ascertain the size of the aperture, to enlarge it, or prevent it from contracting again.

The unyielding materials of the canula were attended with another disadvantage;

for in many urethras, those particularly which require the application of the caustic, the internal membrane is so irritable, as not to allow a hard body to pass along it without inducing spasm, while a softer substance gives no uneasiness; the silver canula was often prevented, by the degree of irritation it produced, from reaching the seat of the stricture; and sometimes when it had been carried down to it, was not allowed to remain there; so that a doubt very often occurred, whether the caustic was really applied to the stricture or not.

This fact of the urethra not allowing a hard substance to remain in it, cannot be better illustrated than by mentioning the effects of the wire bougies; so named from having a small wire in their centre, to give them firmness. These are to appearance exactly like other bougies; but when passed into the bladder of a patient with an irritable urethra, he will generally, from the sensation, discover that they contain a wire, and is unable to allow one of them to re-

main in the passage. I was very much struck with the exquisite sensibility of this membrane, in a patient on whom I passed one of these bougies, which was accidentally among the others without my knowledge. The patient immediately said, the bougie was not to be borne, for there was a wire in it: I declared there was not. But he still persisted, and said that he could not be mistaken. Upon withdrawing the bougie and examining it, I found the wire in its centre.

The state of the urethra in this disease being such as to allow a bougie to pass, and at the same time not to admit a metal instrument, is not peculiar to stricture; but appears to take place whenever the passage is much irritated, without having a reference to the particular cause of irritation. It occurs where the membrane of the urethra is the immediate seat of inflammation, as in gonorrhœa; and likewise when it is affected by sympathy, the disease being in the bladder. The following cases are instances of this.

A patient who had a gonorrhœa, attended with chordee, by catching cold, brought on a suppression of urine : ineffectual attempts were made to draw off the water by means of the silver catheter ; the flexible gum catheter, inclosing a metallic canula, was also several times introduced, but could not pass. After remaining twenty-seven hours without making water, and in much pain, the patient was brought to town, from a distance of twelve miles, and arrived in a state of great irritation. The flexible gum catheter was readily introduced into the bladder, without the smallest difficulty, and drew off three pints of urine.

The surgeon who accompanied the patient expressed his astonishment at the ease with which this instrument passed ; as the hollow bougie, covering a metallic canula, which he had brought with him, was of the same size with that of the elastic gum, and he had never before heard of the one possessing any advantage over the other.

A gentleman had the symptoms of an ir-

ritable bladder and urethra, supposed to arise from stone: attempts were made at different times to ascertain the nature of the disease by sounding him; but no solid instrument could be passed, while a bougie of a middling size went on to the bladder. The case was now considered as a spasmodic stricture, and the bougie recommended. Under this course the complaint grew worse, and the desire to make water came on every five minutes. A flexible gum catheter was now introduced into the bladder, and retained there two days. After the passage had been accustomed to the flexible catheter so long a time, a sound of the same size passed with little difficulty, and a stone was very distinctly felt in the bladder. The irritation from the stone had so much increased the irritability of the urethra, as to make it contract whenever the sound was introduced into it.

A gentleman, aged seventy-four, had a suppression of urine from an enlargement of the prostate gland; a flexible gum ca-

theter passed readily down to the projecting part of the enlarged gland, but could not go over it into the bladder; I therefore put an iron stilet into the catheter, and gave the instrument the necessary curve, for it to get into the bladder; but now it could not be passed lower than $6\frac{1}{2}$ inches, the urethra contracting so as to stop it at that part. On withdrawing the stilet, it could be passed on to the prostate gland; upon introducing it again, it was stopped as before: after repeated failures, I was obliged to give up the attempt of passing it with the stilet, and was so fortunate as to get it into the bladder in its flexible state, the end accidentally slipping over the gland.

Some days after, when the urethra had become more quiet, it admitted the catheter with a stilet to pass; but at the end of four weeks, when the parts had been irritated in consequence of a journey, the canal again refused the instrument with the stilet, but let it pass readily without it.

This will account for the difficulty which

often occurs in passing the staff in the operation for the stone, and which is sometimes hardly to be surmounted.

These objections to the use of the silver canula did not escape Mr. Hunter's penetration. He not only saw them, but devised a mode by which they might be removed, and the application of the caustic rendered much more simple; at the same time that it should be directed with accuracy to the centre of the stricture.

This improved mode of applying the caustic is as follows: take a bougie, of a size that can readily be passed down to the stricture, and insert a small piece of lunar caustic into the end of it, exposing the surface of the caustic, but surrounding it every where laterally by the substance of the bougie. This should be done some little time before it is used; for the materials of which the bougie is composed, become warm and soft by being handled in inserting the caustic; and therefore the hold the bougie has of the caus-

tic is rendered more secure after it has been allowed to cool and harden. This bougie so prepared, is to be oiled, and made ready for use ; but previous to passing it, a common bougie of the same size is to be introduced down to the stricture, to clear the canal, and to measure exactly the distance of the stricture from the external orifice ; this distance being marked upon the armed bougie, it is to be passed down to the stricture immediately upon the other being withdrawn. In its passage the caustic is scarcely allowed to come in contact with any part of the membrane, the point of the bougie, of which it forms the central part, always moving in the middle line of the canal ; and indeed the quickness with which it is conveyed to the stricture, prevents any injury to the membrane, where it is accidentally brought to oppose it.

By this mode the caustic is passed down to the stricture, with little or no irritation to the lining of the urethra ; it is applied in

the most advantageous manner, and can be retained in that situation the necessary time to produce its effects.

This method Mr. Hunter adopted several years before his death, in preference to that which is published in his work; and I have continued to make use of it ever since, nor have I in any case found it attended with disadvantage.

I have mentioned it publicly for these two last years in my lectures, and explained the manner of passing it.

By this mode of arming the bougie, strictures in the curvature of the urethra, which, as I have endeavoured to prove, is their most frequent situation, may have the caustic applied to them, which cannot be done by a silver canula, unless made flexible; and even in that state it is liable to many objections.

SECTION III.

THE EFFECTS OF THE CAUSTIC ON
STRICTURES.

THE application of the lunar caustic to strictures was thus introduced into practice by the late Mr. Hunter, in those cases only that did not admit the smallest sized bougie to pass ; in which, therefore, no mode of relief, without having recourse to a very severe operation with the knife, was at that time known.

Under these circumstances, if it relieved the symptoms of stricture, and procured a freer passage for the urine, it was certainly a discovery of great value.

Against this practice, however, objections have been formed, and many bad consequences have been attributed to it, which it certainly does not produce ; for whatever, *a priori*, might be supposed the effects of so

violent an application, to a membrane so sensible and irritable as the urethra; and I will admit that it is very natural to conceive they would be very severe. The result of experience, the only thing to be relied on, evinces the contrary. The pain that is brought on is by no means violent; and neither irritation nor inflammation is found to take place.

That cases do occur, in which strictures have produced so much mischief, and rendered so great an extent of the canal diseased, that the use of the caustic has proved unsuccessful, is certainly true; and several of these cases have fallen within my own knowledge. But when it is stated, that none, even of these, were made worse by its use; that no bad consequences attend it; and that no other mode, at present known, is equally efficacious; any occasional want of success cannot be considered as an objection to this mode of practice.

But if the apprehension of violent effects from the caustic, however ill-founded, cannot be removed, let the alternative be con-

sidered ; namely, the only operation previously in use, where a stricture cannot be dilated by the bougie.

In those cases we are obliged to have recourse to means certainly more severe and violent, laying open with a knife the diseased urethra, and passing through the divided parts a flexible gum catheter into the bladder. This I have done myself, and have frequently seen it performed by Mr. Hunter, and it always succeeded ; neither bringing on so much inflammation as was expected, nor being attended with any symptoms of irritation.

This practice has by other surgeons been carried still further ; the portion of diseased urethra has been dissected out, and entirely removed ; nor has so severe an operation always brought on untoward symptoms ; and patients have recovered.

If the membrane of the urethra when diseased, is capable of suffering so much injury, without any consequent symptoms of irritation, it cannot be doubted that it will

bear with impunity, to be touched in a very partial manner, several different times with lunar caustic.

As the following observations are published with a view to extend the use of the caustic to a greater variety of cases, and in some measure upon a different principle from that upon which it was applied to impervious strictures, by the late Mr. Hunter, I thought it necessary, before I made known my own opinions upon the subject, to mention the source from which they were derived; and to place the merit of the invention, as well as the mode of applying it, where it was due; reserving to myself all that I have a right to claim, that of the attempt to render it more generally useful.

Having met with a number of facts, from which a general principle appears to be established, that the irritable state of a stricture is kept up, and even increased, by the use of the bougie, but lessened and entirely destroyed by the application of

lunar caustic ; I am desirous to communicate my observations upon these facts, and to recommend the use of the caustic, in many cases of irritable stricture, in preference to the bougie.

As the use of the caustic upon this principle is, I believe, entirely new, and is contrary to every notion that had been formed upon the subject, it will require something more than general assertion, to gain even the attention of many of my readers, still more their belief ; I shall therefore detail the circumstances as they occurred, by which I conceive the propriety of this practice to be established : and afterwards make some observations upon the principle on which it depends.

My connection in practice with Mr. Hunter, afforded me opportunities of attending to cases of stricture, in all their different stages ; many of them brought on during a long residence in India, attended with great irritability, and exceedingly difficult of cure.

One case of this kind, which I shall presently relate, admitted the passing of a small bougie ; but in the course of three years, very little was gained by a steady perseverance in the use of that instrument, either in dilating the canal, or palliating the symptoms of stricture ; this made me look upon the bougie as less efficacious than I had always been taught to believe it. I was willing, however, to consider this as an uncommon case, depending more on the peculiarities of the patient's constitution than on the nature of the disease ; but I found, on a particular inquiry, that several other gentlemen from India were under circumstances nearly similar ; the bougie only preventing the increase of the stricture, but being unable to dilate it beyond a certain size ; and when it was left off, the stricture in less than two months returned to its former state of contraction.

What plan ought to be followed in such cases I was then unable to determine ; but that the bougie could not be depended on

was evident. During this suspense, the following case came under my care.

In August, 1794, a gentleman consulted me for some symptoms which had been considered as indicating the presence of gonorrhœa ; but as they did not yield to the common treatment in the usual time, he was induced to take my advice respecting the nature of his complaint. In the necessary inquiry to obtain a perfect history of the case, among other things it was stated, that, nineteen years before, there was a stricture which became very troublesome, and that Mr. Hunter, by the desire of the patient, had applied the caustic, by which the stricture was removed, and never after returned. He said that he was one of the first persons on whom the caustic had been used. From this account I was naturally led to believe that the stricture had gradually returned, and was now increased so much as to produce the present symptoms ; a discharge being almost always a symptom of stricture, when it is much contracted ; but upon examining

the canal, a bougie of full size passed on to the bladder without the smallest impediment. I therefore took up the case as an inflammation in the urethra; and large doses of the balsam copaiva, given internally, effected a cure.

The circumstance of a stricture having been removed nineteen years before, and not returning, made a strong impression on my mind; and made me desirous to ascertain whether this practice could not be employed in cases of stricture in general, and the cure produced by it, equally permanent. A short time after, I had an opportunity of trying it in the following case.

A captain in the East India Company's service, in September, 1794, applied to me for assistance. His complaints were, great irritation in the urethra and bladder, constant desire to make water, and an inability to void it, except in very small quantities. These symptoms had been at first supposed to arise from gonorrhoea, afterwards rendered more severe by catching cold;

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but not yielding to the usual remedies for gonorrhœa, they were investigated more minutely, and a stricture was discovered in the urethra. The mode of treatment was now changed, and the bougie employed; but its use aggravated all the symptoms, and brought on so great a degree of irritability on the bladder and urethra, that there was an alarm for the patient's life, which was the reason of applying for my assistance.

Besides the local symptoms, this patient had those of quick pulse, white tongue, hot and dry skin, loss of appetite, and total want of sleep, with frequent attacks of spasm on the bladder and urethra. A very small flexible gum catheter was passed, and the water drawn off, in quantity about a pint, which gave him great relief; this was repeated morning and evening, to keep the bladder in as easy a state as possible; but in other respects he continued much the same.

As the present symptoms were brought on by the use of the bougie, little good was to be expected from that instrument; and

where the urethra had been so easily irritated, and was disposed to continue in that state, there was no prospect of the use of the bougie afterwards effecting a cure. These circumstances I explained to the patient ; and mentioned, in proof of my opinion, the case in which so little had been effected in three years.

I then proposed to him a trial of the caustic, with a view to deaden the edge of the stricture, as the only probable means of effecting a cure. The degree of irritation was already great ; I was, however, led to believe, that the application of the caustic was not likely to increase it ; since by destroying the irritable part, it might lessen, and even remove the spasmodic affection ; but if, contrary to my expectation, the irritation continued, we still should be able to draw off the water, as the slough formed by the caustic would prevent the edge of the stricture from acting, and obstructing the instrument.

The application of the caustic was, upon

these grounds, determined on ; and it was applied in the following manner.

I passed a common bougie, nearly the size of the canal, down to the stricture, to ascertain its exact situation, and to make the canal of the urethra as open as possible. The distance was then marked upon a bougie armed with caustic, of the same size, which was conveyed down as quickly as the nature of the operation would admit. It was retained upon the stricture, with a slight degree of pressure ; at first there was no pain from the caustic, but a soreness from pressure ; in less than a minute, a change was felt in the sensation of the part, it was at first a heat, succeeded by the burning pain peculiar to caustic : as soon as this was distinctly felt, the bougie and caustic were withdrawn, having remained in the urethra about a minute altogether. The soreness, he said, was entirely local, by no means severe, was unaccompanied by irritation along the canal, and he thought the uneasiness in the bladder diminished by

it. He described the pain as resembling very exactly the first symptoms of gonorrhœa. This sensation lasted half an hour after withdrawing the bougie.

The caustic was applied about one o'clock in the forenoon, and he passed the day more free from irritation than he had been since the beginning of the attack, which had lasted six days. In the evening the water was drawn off with more ease than the night before. He passed a tolerable night, and the next day continued free from irritation. On the third day the caustic was again applied in the forenoon; the painful sensation was less than on the former application, lasted a shorter time, and in an hour after the armed bougie was withdrawn, he made water freely for the first time since the commencement of his indisposition. He said the irritation in the bladder was removed, and he felt very well. His appetite returned, he slept well, and continued to void his urine with ease.

In this state nothing was done till the

fifth day, leaving always a day between the applications of the caustic.

On this day a common sized bougie went readily into the bladder; it was immediately withdrawn, and the cure was considered as complete; no bougie was afterwards passed, lest it might bring back an irritation upon the passage. I met this gentleman twelve months after, and he assured me he had continued perfectly well, and I have since learned that in three years there has been no return.

From the result of this case, I was encouraged to hope that the caustic might be applied to strictures in the urethra with more confidence than I had hitherto believed, since it evidently did not bring on or increase the general irritation; but on the contrary, seemed to allay it.

In this case it had taken off the disposition to spasm, which appeared to me, as I have already stated, an object of the greatest importance in the treatment of stricture in all its stages. One instance by no means

afforded sufficient evidence to establish the general propriety of this practice ; it justified, however, further trials, and induced me to prosecute the inquiry.

The case I have already alluded to, as having discouraged me more than any other in the use of the bougie, appeared to be a very proper one for the trial of the caustic, and for comparing its effects with those of the bougie, particularly as it had been of very long standing, and the bougie had been persevered in with great patience, for a sufficient length of time, without any considerable benefit. I had an opportunity of trying it, and shall therefore state the whole case here, rather than give it in detached parts.

The gentleman was a lieutenant-colonel in the East India Company's service, forty-two years of age, had been many years resident in India, and during twelve of them had more or less difficulty in making water. He came to England in 1791, and put himself under the care of Mr. Hunter. Upon

passing a bougie, there were found to be two strictures in the urethra, one three inches from the external orifice, the other at the bulb. The canal was extremely irritable, and a bougie, if allowed to remain in it for several minutes, produced uneasiness. The first stricture was, after a considerable time, gradually dilated; and then a small bougie was passed through the second into the bladder; after this had been continued daily, a few minutes at a time, for about a week, one a single size larger, was introduced. This larger bougie had been used for two days without any pain; but on the third, the patient, immediately after it was withdrawn, walked nearly a mile; he felt a little uneasiness, which he attributed to the walk. This was followed by a spasmodic irritation in the urethra and bladder, and in the evening a complete suppression of urine took place: in this state he remained all night, taking opium, and using other modes of relief, but without effect.

About four o'clock in the morning a bougie was passed down to the stricture, and allowed to remain there, pressing against it. This application was continued for fifteen minutes; the spasm began to abate, allowing a few drops of urine to pass, and in a few hours it went gradually off.

The bougie was now laid aside; some time after it was again tried, and things went on tolerably well for about ten days, when an uneasiness was felt in the perinæum, and a hardness discovered there, which made it necessary again to leave it off. This hardness increased, and formed a very large abscess in perinæo, which was opened. It contained about three ounces of matter, but had no communication with the urethra; and in two months healed up. When the parts were perfectly recovered, as there seemed to be no alternative, the bougie was again resorted to; and as the common sort did not lie in the passage without giving uneasiness, those of a softer

kind were tried, and found to answer better; but unfortunately whenever they were regularly persevered in, they brought on, in less than two months, a local irritation, attended with constitutional indisposition, which made it necessary to omit them for a week or a fortnight. From these circumstances, at the end of three years, a bougie of no considerable size, composed of the softest materials (white wax and oil, in nearly equal proportions), could only be retained for ten minutes without irritation; but if used regularly longer than a month, irritation came upon the parts.

After having suffered so much under the course of bougies, the patient was willing to make trial of the caustic, and on the 20th of November, 1794, it was applied to the stricture, nearest to the orifice of the urethra, which at this time did not admit a bougie of half the common size; the effect of the caustic, after remaining a minute on the stricture, was local soreness, but no irritation; the soreness continued a quarter

of an hour, and went off. The sensation was totally different from the uneasiness he had always experienced while a bougie was retained in the stricture, and although more acute, was by no means so difficult to bear; this was so decidedly his opinion, that as soon as the caustic was removed, from which he had expected very severe effects, he declared that he would at any time prefer the application of the caustic to having a bougie passed through the stricture. It was applied again on the 22d, and produced the same effects in a less degree. On the 24th, a full sized bougie was readily passed through the first stricture, down to the second. The caustic was now applied to this stricture; after using it three times, with the interval of a day between each application, a full sized bougie could be pushed on to the bladder, but did not pass with ease; the caustic was therefore used a fourth time, and then the bougie went into the bladder, and he made water freely. Thus, in fourteen days, by means of the caustic,

a full sized bougie was passed into the bladder without the smallest degree of irritation ; an object which could not be effected by dilating the passage with a bougie for three years together. As the urethra had proved to be so very irritable, it was not thought prudent to use a bougie, the parts were therefore left to themselves.

In the beginning of February, 1795, this patient caught cold, and was confined to his bed with a fever, and symptoms of oppression upon his breast, from which his life was considered in danger. For these complaints he was twice bled freely, and otherwise much reduced ; during the whole of this illness there was no return of his stricture, or irritation in the bladder ; but while he remained in the weak state in which it left him, on the 14th of February, he had in the night a frequent desire to make water, which passed in small quantities, and towards the morning he had some irritation in the bladder. He sent for me, a good deal alarmed at this return, after having

been ten weeks free from the complaint. I saw him at eleven o'clock. On hearing his account of the symptoms, I objected to the use of the bougie, as it had always increased the irritation when employed.

The application of the caustic to the stricture appeared to me a preferable measure, since in its present contracted state, it would be more certainly opposed to the caustic, and more effectually destroyed. This was immediately agreed to; and in five minutes after it had been used the spasm went off, and he made water with ease to the quantity of half a pint, which emptied the bladder, and entirely removed the irritation. As the stricture had evidently in some degree returned, and as I conceive that the only chance of a permanent cure depends upon the contracted part being equally dilated with the rest of the canal, or nearly so, I was not satisfied with his making water freely, and returned to the use of the caustic, to procure so desirable an effect. It was again applied, twice to

the first stricture, and twice to the second ; after which a full sized bougie could be passed readily into the bladder. As this return might be attributed to leaving the urethra entirely to itself, after the use of the caustic, it was now judged proper to pass a bougie once a day, five minutes each time, for a fortnight, and then once a month, to ascertain the state of the canal ; at the end of four months I had an opportunity of passing a bougie, and at that time the stricture had not in the smallest degree returned. This gentleman went to India, and has had no return of the symptoms of stricture.

From the result of this case, in addition to the preceding, I was satisfied in my own mind that I had discovered an effectual mode of treating those strictures, which do not admit of being relieved by the use of the bougie, and from that time have adopted this mode of treatment as a general practice. What has been already stated, is to be considered as the ground-work

upon which this practice was taken up; and I thought I could not convey to others, more distinctly, the facts collected from these different trials, than by detailing the cases in the order in which they occurred. Having done this, it remains to draw some conclusions from them, respecting the principle upon which the caustic produces this effect; and to annex the varieties which occur in the disease, and the different symptoms that are brought on by the use of the caustic.

SECTION IV.

TO SHEW THAT SPASMODIC AFFECTIONS ARE MORE READILY BROUGHT ON BY SLIGHT IRRITATIONS, THAN BY THOSE THAT ARE VIOLENT.

THAT the delicate and vascular internal membrane of the urethra should admit of a portion of its surface being destroyed, without any symptoms of consequence being produced by this violent application, is so curious a fact, that it almost staggers our belief; and any one is excusable who at first view may condemn this practice as unwarrantably bold.

For this reason I have thought it my duty to be minute in detailing the proofs upon which this practice is built, in order to reconcile it to practitioners, and incite them to make trial of it. It is rendered, indeed, the more wonderful by the knowledge of the

fact that the most distressing symptoms do frequently follow very slight degrees of irritation affecting the same membrane.

Although at first we are unable to reconcile this to our minds, from being too strongly impressed with an idea of the delicacy and sensibility of the organs of generation, whose functions are so peculiarly under the influence of our imagination; yet if we divest ourselves of that influence, we shall find it perfectly conformable to the effects that take place in other parts of the body, and to the general laws of sensibility and irritability.

It is a general fact, that wherever a slough is produced, there is less inflammation, both in degree and extent, than from any other injury, of the same or even a less degree of violence. This is well known to all military surgeons, who are daily seeing illustrations of it; a bruise from a spent ball brings on violent inflammation over the whole limb; but if the ball passes with velocity, and goes directly through the

limb, it acts like a caustic upon the surface to which it is applied ; and destroys the parts to a certain depth, producing no more inflammation than is necessary to separate the slough. This inflammation is slower in coming on, and is almost wholly confined to the neighbourhood of the ball's passage. Is it then, we may ask, extraordinary that an analogous effect should take place in the membrane of the urethra, or is there more difficulty in accounting for it ? The caustic deadens the surface it injures, and takes from it the power of conveying irritation ; the surrounding parts therefore have only the degree of inflammation induced upon them that is necessary to remove the slough, which is very superficial, and extremely small ; but where the parts are not destroyed by the violence, the natural actions are disturbed, and the symptoms of irritation may be carried to any degree, according to the sensibility and irritability of the parts.

An effect similar to this of which we now

treat in the urethra, takes place on the tunica conjunctiva of the eye. If a mote or hair gets between the eyelids and the eyeball, it sometimes brings on a violent irritation, and the whole surface inflames; but this by no means is the case when the lunar caustic is applied to any part of the same surface, as may be illustrated by the following case.

A man about forty years old, had a film beginning to grow upon the cornea of one of his eyes; and this newly formed part was supplied with blood, by a plexus of vessels distinctly seen through the tunica conjunctiva. With a view to destroy these vessels, I applied lunar caustic three different times to the tunica conjunctiva, about a quarter of an inch from the edge of the pupil; it gave him a good deal of pain, but brought on no general inflammation or irritation upon the membrane.

Spasmodic actions in general, both constitutional and local, are brought on by slight degrees of irritation, and are usually relieved by violent applications. The locked

jaw, and other affections of the tetanus kind, are the consequences of wounds and fevers; but the time of their coming on is either when the wound has not begun to inflame, or after it is in an healing state; and the fever is going off or entirely removed when they arise from that cause. The shock, from plunging into the cold bath, a very violent application to the surface of the body, has been found of advantage in this disease.

Spasms in particular muscles, as, in the intercostals, diaphragm, muscles of the arm, or leg, come on from slight constitutional irritation; or local injuries, attended with little violence; the cause is often so slight as entirely to escape discovery, and the treatment most generally found to succeed is blistering the surface nearest to the part affected, which is one of the most violent applications we are enabled to employ.

In surgery it is a fact too well ascertained to require any illustration, that local irritations are more commonly removed by

stimulating applications, than by those that are mild; and here they are applied directly to the part affected. Sores in different parts of the body are often attended with extreme sensibility, and this symptom is frequently aggravated by poultices of bread and milk, preparations of lead or opium; but poultices of arsenic, or the solution of caustic, applied to the whole surface, in many cases give ease, after being used some time, and in the end produce a cure.

This general principle of spasmodic affections and local irritations, yielding more readily to stimulating applications, is now found equally applicable to affections of the urethra. This not only appears when the stimulating application is made to the part itself; but also, in a less degree, when it affects a neighbouring part; for the inflammation arising from gonorrhœa, in one part of the canal, will sometimes take off the spasm from a stricture in another part, some inches distant; the same effect is occasionally produced by irritating applications.

Of this I shall mention the following very curious instance.

A gentleman of fortune who had a spasmodic stricture, was a considerable time under the care of Mr. Hunter, without receiving any benefit from the different modes of treatment that were used for his relief; finding no benefit from the regular practice, as it is termed, he applied to a well known empiric, who examines the water of his patients, and in general discovers that they have had gonorrhœa, which, according to his cant, has been too suddenly stopped, and from this virulent matter being locked up, accounts for their present complaints, whatever they may be. He therefore proposes to bring back the discharge, which is effected very ingeniously by passing a stimulating bougie three or four inches along the urethra; and after promoting this discharge for some time, he leaves off the use of the bougie, and the discharge soon disappears; the complaints either do or should disappear along with it. This, his common

practice to all patients, was made use of in this case of spasmodic stricture; he passed a bougie, smeared with balsam copaiva, a few inches up the urethra, and by this application had the good fortune to remove the disease; for the violence done to this part of the membrane, took off the spasmodic action from that nearer the bladder, and the patient got perfectly well.

SECTION V.

OF THE COMPARATIVE EFFECTS OF THE
BOUGIE, AND OF THE CAUSTIC, UPON
STRICTURES.

THE bougie, it has been already observed, in recent cases, is sometimes sufficient to produce the cure of stricture, and then no other means are necessary. Where the bougie is capable of dilating the urethra to its natural size, it is to be preferred, as being not only more simple, but less alarming to the mind of the patient. Were the bougie capable of producing this effect more generally than it is, there would be therefore less occasion to have recourse to the caustic.

It is not my intention by any means to discourage the use of the bougie, which is certainly a very useful instrument; but as it is found to be limited in its powers, it becomes important to point out a more

active application, which may be capable of producing a cure, where that shall have proved inadequate.

In comparing the effects of the bougie with those of the caustic, strictures only that have been of long standing are here to be considered; and it has been already stated that, either from ignorance or bashfulness, too many strictures in the urethra arrive at that state before any thing is done for their relief.

It appears, from the observations which have been made, that these strictures commonly admit a small bougie to pass into the bladder, but will not allow of its being gradually increased, so as to dilate the passage at that part to a tolerable size; in all such cases the cure cannot be effected by that instrument. This is so obvious that it cannot be denied.

There are other cases, in which there is less irritation, that admit of being dilated by the bougie to a certain degree, but never to the natural size of the canal; when this

is effected, the bougie is left off, as no further benefit can be derived from its use; and it has been erroneously believed, that no advantage would result from the canal at this part being made wider.

The patient, as his water passes tolerably well, is supposed to be cured; but unfortunately in less than two months the symptoms return, and the bougie must again be employed, which, after its application, leaves him only in his former state, and as liable to relapse as before.

This cannot be considered a cure, it is only a temporary relief,—for the stricture still exists, although in a less contracted state; and the relapse is brought on, most probably, from the urine still having a greater resistance to overcome in passing through the narrow part, which keeps up an irritation there, and brings on a spasmodic action; so that in a short time it becomes as much contracted as before.

In both these stages of stricture, where it cannot be dilated by the bougie, and

where the dilatation can only be carried to a certain extent, the caustic has a manifest advantage, being capable of effecting what the bougie cannot do, namely, removing the stricture entirely, and making the canal of the same size, or nearly so, in every part. When this is accomplished, the urine, in passing along the canal, must press every where equally, and dilate the whole passage to the same extent; and by doing this, will prevent, as much as possible, a return of the disposition for forming a stricture.

In this comparison of the effects of caustic, with those of the bougie, upon strictures, there is an advantage seldom to be obtained in similar investigations; which is, that both modes have been tried, in almost every instance adduced in favour of the caustic. The trials of the bougie have in general been made for a considerable length of time, by several different surgeons, and upon patients whose situations in life enabled them to do justice to the plan

that was laid down for their relief. The conclusions which are drawn from the results are therefore the more to be depended on.

Upon the whole, in estimating the advantages of the caustic, in the more advanced stages of stricture, I think, from what has been advanced, we may safely infer, that it is a mode of treatment more extensively useful, milder, quicker in its operation, more effectual, and more permanent than the bougie.

SECTION VI.

THE SYMPTOMS PRODUCED BY THE CAUSTIC
IN THE PROGRESS OF THE CURE.

It may be proper to mention some general directions for applying the caustic to strictures, and the effects which it produces on the parts.

In arming a bougie, it will be attended with some difficulty to get the piece of caustic of a proper shape and size for the purpose, unless it be cast in a small cylindrical mould.

In this state it is to be procured from Mr. Savigny, instrument maker, in King-street, Covent-Garden; and if these pieces are thicker than the bougie can readily inclose, by putting them in water the outside quickly dissolves, so as to diminish their size as much as is required. The piece of caustic so prepared is to be cut into small

portions, about a quarter of an inch in length, and an orifice being made in the end of a bougie, the caustic is to be inserted into it, and the bougie rolled, so as to be made perfectly smooth, taking care that the sides of the caustic are every where covered, and only the end exposed.

This was the mode in which I armed bougies when I first took up this practice; but it happened that, in two or three instances, the caustic was left in the urethra; that canal when in a very irritable state, grasped the bougie, and pulled the caustic out; I was therefore led to consider how such an accident might be prevented, and applied to the makers of bougies for that purpose. Mr. Pass, the beadle of the surgeons' company, who deals in bougies, discovered a very ingenious and effectual mode of securing the caustic. In forming the bougie a piece of wire, the size of the caustic, is rolled up along with it, passing into the substance for half an inch; when the bougie is nearly finished, the wire is

withdrawn, and the caustic inserted in its place ; after this, the bougie is rolled again, so that the sides of the caustic become firmly cemented to the linen, by means of the composition of the bougie, and when cold, cannot be separated by any force. In this way bougies are now generally armed.

After the bougie has been thus prepared, the distance of the stricture from the external orifice is to be measured, and the canal cleared by passing a common bougie, fully as large as that which is armed. The armed bougie, with the distance marked upon it, is then to be introduced, and applied to the stricture ; when it is brought in contact with the obstruction, it is to be steadily retained there, with a moderate degree of pressure at first, and less as it is longer continued, since the bougie becomes soft by remaining in the urethra, and readily bends, if the pressure is too great. The time it is to remain depends a good deal upon the sensations of the patient, and the length of time the parts have been diseased ;

but on the first trial it should be less than a minute, as it then commonly gives greater pain than on any subsequent application. The pain produced by the caustic is not felt so immediately as it would be natural to expect ; the first sensation arises from the pressure of the bougie on the stricture ; a little after, there is the feeling of heat in the parts ; and lastly, that of pain.

As soon as the caustic begins to act, the surgeon who makes the application is made sensible of it by the smaller arteries of the parts beating with unusual violence, which is very distinctly felt by the finger and thumb that grasp the penis.

The pain that is brought on by the caustic lasts for some time after it is withdrawn ; but this period differs in almost every patient, being sometimes extended to half an hour, and sometimes only a few minutes.

The kind of pain is heat and soreness, which is not severe, not being accompanied

by the peculiar irritation, upon so many occasions experienced by patients who have strictures ; an irritation that cannot be described, which is most insupportable, and is too often brought on by dilating strictures with the bougie. After the caustic has been withdrawn, it is desirable that the patient should make water before he uses exercise, as the parts are commonly more tranquil after having done so ; but sometimes no water will flow at the first effort. When that is the case, it should not be urged, as it is not of any material consequence. It happens not unfrequently, that at the first time of making water, some blood passes along with it. This is rather favourable ; as when the parts bleed, the stricture usually proves to be so far destroyed, that at the next trial the bougie passes through it. Every other day, appears in general to be as often as it is prudent to apply the caustic. I have, however, done it every day, in very obstinate cases, where

the parts are less sensible, without any detriment.

The bougie which is passed down to prepare the way for the caustic, and measure the distance for the armed bougie, must be made of soft materials, that it may readily receive an impression from the part against which it is pressed, and its colour should be light, so as to admit of those impressions being more distinctly seen. With the assistance of such bougies, I am able to discover the size and shape of the orifice of the stricture ; to ascertain with accuracy the progress of the caustic upon it ; to see whether it is on one side of the canal, or equally all round ; and to apply the caustic accordingly.

When the soft bougie passes through the stricture, by leaving it in the canal a few minutes, it can be known whether the stricture is completely destroyed or only relaxed ; in the last case there is an impression on the side of the bougie.

So necessary is the information which is acquired in this way, to enable the surgeon to prosecute the cure of stricture by means of the caustic, that without it I should have been unable to pursue this mode of practice. I should have wanted a sufficient degree of confidence to carry me on, which nothing but an accurate knowledge of what had been already done could have given, and in no other way is that to be acquired.

In cases where, from long continuance of the stricture, there is so much induration, that the caustic makes very slow progress, which sometimes happens, the parts in time become so much accustomed to it, that it gives little or no sensation when used, but afterwards brings on the same irritation and irregular contractions in the urethra that follow the use of the common bougie; whenever this takes place, I believe it should be for a time left off.

This remark is less applicable to strictures that admit of a bougie passing on to the bladder, than to those of a worse kind

in which a bougie of the smallest size cannot pass.

In cases of stricture, attacks of inflammation frequently come on the passage after connection with women; in this state of the parts the caustic should not be applied, for the pain is infinitely greater than at other times, is of longer continuance, and seems considerably to aggravate the inflammation along the canal, but does not bring on spasm or suppression of urine. It is more prudent to defer the application of the caustic till the inflammation subsides, which it generally does in a few days.

The effects of the caustic, as it is natural to suppose, vary in different men. In some men the pain is so little attended to, that they continue their former amusements, and do not even refrain from excesses of every kind, and yet pass with impunity; that such patients, however, are not always so secure, will appear from the Cases.

The pain is sometimes not felt at the time of the application, which then can be

guided only by conjecture ; but it comes on a few minutes after the caustic is removed, is very severe, and lasts for hours.

Where the stricture produces uneasy symptoms, the patient is often freed from them on the day when the caustic is applied ; but they return on the following day ; so that in such cases, the application of the caustic, instead of giving pain, produces ease. In some instances there has been a considerable hæmorrhage from the parts to which the caustic was applied ; this, as will appear from the Cases, has generally been brought on by imprudence, but in no instance has been attended with bad consequences.

There is a substance which in some cases comes away after the application of the caustic, either the same day or the day following ; it is dark coloured on the outside, and of a light colour within, is tubular, and of different sizes. In general the portions are too small to afford any infor-

mation respecting it ; but in one instance I procured a portion an inch long, and have preserved it upon a bougie in spirits. It is evidently the cuticular lining of the urethra, and I believe only comes off where a portion of that canal has been in a contracted state between two strictures, and one of them being destroyed, this part is dilated, and the cuticle thrown off. The surface is more tender next day, but that symptom quickly goes away. There is sometimes a succession of these cuticles brought away ; when they come from the space close to an old stricture, they have a conical form, and obstruct the urine, till thrown out. When these cuticular portions separate, the caustic should only be passed every third day.

If there is any peculiar symptom which comes on whenever the patient is guilty of irregularity, it will commonly also be produced by the caustic, till the parts are accustomed to the application ; the patient is therefore to be directed to follow the same

modes of relieving himself, should such symptom occur, as he was in the habit of employing before.

If he has been accustomed to have spasms which were relieved by passing a bougie ; they may happen the day after the caustic is employed, and will be readily relieved by that mode.

If a paroxysm of fever, or an ague fit, as it is termed, has frequently come on, it will most probably do so under the use of the caustic. In many instances it occurs upon the destruction of a stricture, and where strictures have been of long standing, a regular attack has followed upon any of them giving way. The only mode of treating this symptom which appears necessary, is giving opening medicines. Some uncommon instances of these paroxysms of fever, are mentioned in the Cases. They most commonly occur in patients who have been in warm climates, but are by no means confined to them.

It often happens that when there are

several strictures, the application of the caustic to that which is nearest to the external orifice affects all the others, and makes them relax; so that the stream of urine which before had been very small, shall now be large and free; but after this stricture has been destroyed, and the caustic is applied to one nearer the bladder, the very contrary effect is produced. This sympathy between strictures is sometimes the cause of patients and even surgeons forming too favourable a prognostic.

The effect of the caustic when applied to the first stricture in taking off the spasmodic contraction of the others, is well illustrated in the following case.

An officer in the navy who had been troubled with strictures for many years, was taken ill at Portsmouth with a suppression of urine; this did not go off, and an operation was thought necessary to relieve the bladder. Mr. Lynn was sent for from London to take charge of the patient; on his arrival he found the bladder very much

distended; but by the means which he employed, an involuntary discharge took place, which prevented any increase of the distension, and made an operation not immediately necessary: he therefore ordered the patient to London. When he came to town, Mr. Lynn desired that Mr. Rush and I should meet him in consultation. At the meeting it was stated by the patient that no bougie could be passed into the bladder since this attack began, although several attempts had been made before Mr. Lynn got down to him. At this time the bladder continued much distended, the integuments above the pubes inflamed, and in a state of suppuration. Mr. Lynn wished to know whether these attempts ought to be persevered in, or whether the use of the caustic might be attempted with safety.

After considering all the circumstances, I gave it as my opinion that the caustic was a much safer instrument than the bougie, more likely to remove the spasm than any other mode, and its use attended with less

risk than passing small bougies in that state of the parts. Mr. Rush and Mr. Lynn concurred in this opinion, and a bougie was immediately passed down to the first obstruction about four inches from the external orifice at the glans penis, and afterwards an armed bougie was applied to it; the pain was sharp, and continued during the rest of the day. After an interval of one day, the caustic was again applied, and he made some water in a natural way; this he continued to do at intervals of two hours. The use of the caustic was continued, and in the course of five months a passage was procured into the bladder, and he was cured of all his symptoms. In this case a strangury of near four days, and the disease which produced it, were removed by caustic.

I have taken some pains to explain that it is necessary, for the cure of strictures, that the canal at that part should be brought to the same width, or nearly so, with the rest of the passage. This is so obvious that it cannot require being insisted upon; and

yet in very many instances in which strictures have been removed by caustic, under the direction of different practitioners, this has not been sufficiently attended to, the patient has been disappointed, and the mode of treatment has been hastily condemned, from being injudiciously used.

This imperfect mode of applying the caustic, by which the stricture is only partially removed, has arisen from two causes ; the most common of these, I believe, has been a want of confidence in the practice, rather choosing to do too little, than take further responsibility. This may be thought prudent, but it is neither just to the patient nor to the mode of practice employed. The second cause is, that the orifice of the urethra, in cases of stricture, contracts in consequence of the stream of urine being too small to keep it of its natural size ; and the surgeon mistakes the apparent size of the orifice for that of the urethra, which is commonly much larger. I have been very frequently deceived in this way, and after I had

made the strictures equally wide with the apparent size of the orifice, considered my patient as cured ; but the symptoms not going completely off, or returning soon after, led me to try a bougie of a larger size, and in that way I found out my mistake, and corrected it by making use of a larger sized bougie, after which the symptoms have gone entirely away.

There are instances of strictures returning after they have been removed by the caustic, and several of these are noticed in the first section of the following chapter. I believe that in such cases the stricture has not been completely removed, either from one of the causes I have already stated, or the following circumstance, which may mislead the surgeon, although in a very different way.

Many strictures in which the permanent contraction has either originally been small, or has been diminished by the effects of the caustic, have a considerable spasmodic action ; this effect the caustic has a power of

subduing, and by doing so is admitted to pass through ; by which means many strictures of this description elude the effects of the caustic, and are prevented from being wholly removed.

To give cases illustrative of every practice that is laid down, would prove unnecessarily tedious ; but the following will explain the disadvantages attending the use of the caustic, when too small for the size of the urethra.

A gentleman had three strictures, for which he put himself under the care of a person in considerable practice ; who recommended the use of the caustic. It was applied a great number of times, and at length a bougie was passed into the bladder. He was now told he was cured ; but unfortunately all the symptoms remained with little abatement. Medicines were then given to relieve the inconveniences which the caustic had not removed ; but at the end of four months, he said he was tired of having two evils, the disease, and the course of

medicines: he therefore got rid of the one, which was in his power, and made up his mind to bear the other as well as he was able. Under these circumstances I saw him. Upon examining the parts, the orifice of the urethra appeared very small, and was in some measure contracted. I told him that the error had arisen from supposing the size of the urethra was the same with that of the orifice, which was a deception; as the orifice had contracted itself to the size of the stream of urine, in consequence of the stricture lower down preventing the urine from keeping it stretched to its natural size. I therefore proposed applying the caustic to the orifice; and when that was made larger, to proceed to the other strictures as they occurred. As soon as the caustic had enlarged the stricture next the bladder, the patient felt relief, made water with more ease, and in a larger stream, and the discharge and other symptoms began to abate. Three or four applications allowed a bougie of a full size to pass into the bladder, and the symptoms

went off. In this case, the former treatment had reduced the strictures, but not removed them, and kept the canal in a state of irritation, so that the symptoms were not even palliated; for though the canal was absolutely larger than before the caustic was applied, the strictures which remained were rendered more irritable.

The same thing has happened to other patients from the injudicious use of the caustic, very much to the discredit of this mode of practice.

SECTION VII.

THE EFFECTS OF THE CAUSTIC, WHEN BY
ACCIDENT IT REMAINS IN THE CANAL OF
THE URETHRA.

WHEN the use of the caustic was first introduced, a variety of objections were made to this practice; one which had very great influence upon many patients, was the dread of the caustic remaining in the canal. Such an accident was supposed to be worse than death.

That such an accident has happened cannot be denied; but the effects have nothing very alarming in them, as will appear from the following cases; and the mode which I have now directed for arming bougies, puts it in the power of every practitioner in future to avoid the possibility of meeting with this accident.

I think it right at the same time, that I

state the effects which the caustic, when so left, has produced, to point out what should be done when such an accident happens, so as to turn the accident as much as possible to the advantage of the patient.

Cases of Caustic remaining.

CASE I.

In April, 1796, a gentleman had a stricture to which the caustic was applied above fifty times, in different trials to subdue it; and in all these attempts the caustic had never given any severe pain, or brought on irritation. Finding the common means ineffectual, I applied the caustic so long to the stricture (which was at seven inches) that it dissolved out of the bougie: the pain was not very severe. He passed some urine, but did not bring away the remains of the caustic; about half an hour after, he made water more freely, and a small portion of the caustic that was undissolved came away;

there was a pain and tenderness in the canal for three days, after which time it went off entirely. As the patient knew all the circumstances, and his mind was naturally alarmed, the pain not being considered as much more than usual, was a sufficient proof that it had not been very great.

CASE II.

A gentleman had a stricture about three inches from the external orifice, to which the caustic was applied fourteen or fifteen times, of a large size, without subduing it; and not gaining any ground, I applied a caustic two sizes larger than that which I have generally employed, and let it remain some time at the stricture; it came out of the bougie, and remained in the urethra: he did not make water, but went home without knowing any thing particular had happened. I told him the application had been more than commonly severe, and therefore he had better remain quiet.

Nothing was done for two days ; after which I asked him if the pain was great ; he said it lasted longer than usual, but made no other remark. As he did not know that the caustic remained, his mind was not influenced ; nor was the difference so great as to enable him to make the discovery, or even to take notice of any difference till he was asked, and then he only said that it lasted an hour longer than common. The stricture was more acted on by this application, and he felt himself evidently better after it, and only made water twice a-day, which he had before done much more frequently.

CASE III.

A gentleman whose sufferings from stricture had been for many years extremely severe, being subject to attacks of irritation that were frequently brought on, and much increased, by passing calculous matter, had the caustic applied to a stricture, three

inches from the orifice, fourteen or fifteen times, with little effect; it neither gave much pain, nor produced irritation; the size of the caustic was therefore increased in proportion to the want of effect. The sixteenth application of the caustic was continued for a considerable time; and when it was attempted to be withdrawn, the stricture acted so strongly upon the bougie as to pull off the caustic, with some of the wax of the bougie, and retain it. The alarm on the patient's mind was very great, almost such as to make him faint. I begged that we might take advantage of this accident immediately, and passed a bougie down to the caustic, to prevent it from leaving the stricture it was intended to act upon.

The pain was not severe, and after the bougie was withdrawn he made water. His mind did not readily recover itself; but, on my telling him I would not see him for three days, as we could not go on with the caustic for that space of time, and the pre-

sent accident required nothing being done, he was in some measure composed. And next time I saw him he confessed that the pain was not great, even augmented as it was by his apprehensions. The passage was irritated by some calculous matter lodging near the bulb of the urethra, which had remained there four days; having been in that part at the time the accident happened, and being probably the cause of the spasm which occasioned it. We were able in five days to proceed with the caustic, and the stricture was in a degree benefited by this unintentionally violent application. Some time after this, the caustic passing through another stricture, and being allowed to remain a little time, a spasm came on, and, in attempting to withdraw the bougie, the caustic was again retained. This brought on more inflammation than the time before, and it was fourteen days before it went entirely off: it did not, however, prevent the patient from persevering in the use of the caustic.

In addition to these facts, I shall mention one of a different kind.

A gentleman who, in a state of intoxication, had been carried at night into a house of bad fame, in the morning was much astonished at his situation; alarmed for the consequences of his imprudence, he expressed so great an anxiety respecting his health, that his female companion told him to make his mind easy, she would give him an injection that prevented all infection; by mistake she gave him the caustic alkali undiluted, instead of a weak solution of it in water. He injected it, and brought on very great pain; but neither suppression of urine nor irritation on the bladder followed; local soreness and pain in making water were the only consequences. The membrane to which it had been applied, came off in form of a slough.

SECTION VIII.

THE APPEARANCE WHICH THE URETHRA
PUTS ON AFTER STRICTURES HAVE BEEN
REMOVED BY CAUSTIC.

IN considering the effects of the caustic upon strictures, the first question that occurs is, in what state are the parts left after the stricture has been destroyed? To this, till very lately, I have been unable to make any direct answer. From the urethra allowing a bougie to pass smoothly along it, after the effects of the caustic, there was every reason to believe that the surface at that part was made smooth and upon a plane with the rest of the canal; but as in some cases this part remains tender for a considerable time, and from this greater degree of sensibility the patient can tell when the bougie is passing over it, an idea has been raised in the minds of some people

that this spot while it remains tender, must be in the state of an ulcer, and that any discharge which continues to flow from the canal must come from that part.

I have lately had an opportunity of seeing the parts after the caustic had been used, in the following case.

A gentleman had a stricture for many years, which produced a fistula in perinaeo; the symptoms at last became so severe as to bring on strangury and irritation, which obliged him to come to England. Upon catching cold he was subject to violent attacks in his stomach, which were considered as gout.

Upon his arrival in England I was consulted; his symptoms were great irritation in the region of the bladder (supposed to be from stone) attended with frequency in making water. On passing a bougie a stricture was met with $3\frac{1}{2}$ inches from the orifice; this decided the complaint to be strictures, and till these were removed no opinion could be given respecting the bladder. It was incon-

venient for him to stay in town, and the surgeon who attended him in the country was under my direction, to use the caustic; its use was begun Oct. 31, 1796. Three strictures were met with, one at $3\frac{1}{2}$, one at 5, and one at 6 inches; the caustic was applied nine times before the bougie went into the bladder, and then with difficulty. An ague came on, which was very severe, and on this account the caustic was left off the 18th of November. Some professional business brought him to London in December, and the complete removal of the stricture was put off till his return into the country. While he was in London he caught cold; had for several days aguish symptoms, which were followed by one of his usual attacks, supposed to be gout in the stomach. This was so violent as to make the attendance of a physician necessary; the pain in the stomach increased, constant vomiting came on, and in a few days he died.

From inspection of the body, it was observed that the cause of death was perito-

neal inflammation; the internal membrane of the stomach not being inflamed. This attack then appears to have been the consequence of an inflammation of the bladder, from exposure to cold; for its internal membrane was much inflamed, and the stomach and bowels had been only sympathetically affected.

I had an opportunity of examining the state of the urethra.

The space where the first stricture had been was scarcely discernible, and the membrane was nearly in the same state as the rest of the canal; its connection with the surrounding parts having the natural appearance.

The space where the second stricture had been situated had also put on the natural appearance, but the membrane had a closer attachment, by means of the adhesive inflammation to the surrounding parts.

At six inches from the external orifice there was an irregularity on the lower surface, in the situation of the third stricture,

the internal membrane having been removed for the space of a quarter of an inch, and a new membrane formed in its place, but there was an irregular ridge at the end of that space, which had not been destroyed, and must still have occasionally obstructed the passage of the bougie towards the bladder.

From the dissection in this case, the real state of the parts after the use of the caustic is ascertained; there is a membrane formed similar to the natural lining of the canal, no granulations project beyond the surface, and no appearance of ulceration remains.

From what takes place after injuries committed on the inner membrane of the mouth, which is in most respects similar to that which lines the urethra, I had no doubt of the membrane of the urethra being readily renewed after the effects of the caustic; but before this case was examined I had never seen that it was so.

SECTION IX.

CIRCUMSTANCES UNDER WHICH THE USE OF
THE CAUSTIC HAS PROVED UNSUCCESSFUL.

WHEN I first published upon the use of the caustic, my experience was very limited, compared with what it has been since that time ; as will appear from the variety of circumstances attending this disease, which are now registered in the Cases.

In the first edition of this work I stated every difficult case which had been under my care. In the present I have endeavoured to follow the same plan ; but the number of cases has been too great, to allow me to do more than to select those that explain some circumstance respecting the disease, or mode of treatment ; and the number which have appeared to me necessary for that purpose is so great, that I have more reason to fear the reader will think it unnecessarily large, than too small.

It is no small commendation of this mode of practice, that every untoward circumstance which I have met with from the use of the caustic, and every case that has had an unfortunate termination, has a place in the present work.

In several instances the caustic has failed of success; of these I shall now take notice, mentioning the circumstances under which these failures have happened; I shall also state the number of instances of each particular kind.

In some constitutions where the patients have resided long in warm climates, every time the caustic is applied to a stricture, a regular paroxysm of fever, called by the patient an ague, takes place; and this has been so violent as to render it impossible to pursue this mode of practice. Of this I have met with two instances. I consider this disposition to fever, as the effect of climate, and not of any natural peculiarity of constitution; for the brother of one of these patients laboured under the same

disease, but as he had not been in warm climates, it was removed by the caustic without his experiencing such attacks.

In gouty constitutions, attacks of the gout have in two instances brought on spasmodic constrictions, after the stricture had been removed by caustic. This, however, cannot be called a failure of the caustic. It only shews that gout can affect strictures, and re-produce them.

In some patients the strictures are so obdurate, that the use of the caustic is necessary to be continued for a longer time than the parts can bear its application, or even that of the bougie passing along the urethra; irritation therefore comes on and stops the progress of the cure, and when the same means are resorted to again, the same thing takes place. The cases of failure of this kind that I have met with, some of which may yet ultimately be cured, if the patients will take the necessary steps for that purpose, amount in all to six.

In some patients the stricture is readily

removed by the caustic, but in a few weeks contracts again. The stricture being wholly spasmodic, the caustic, by taking off the spasm is allowed to pass through, and cannot completely destroy the stricture. Of this kind I have met with one instance, which I must consider as a failure, as I have hitherto been unable to get the better of it.

In those cases where the caustic gradually removes the stricture, and brings the ur  thra to a size that allows the patient to make water perfectly well, if there is any return, it is not to be attributed to the failure of the caustic, but to the want of proper management, either from the caustic being too small, or its use left off too soon; but all such cases are, I believe, within the power of being cured by the caustic, if its use is recurred to when that is found necessary.

CHAPTER IV.

CASES ILLUSTRATING THE APPLICATION OF
THE CAUSTIC TO STRICTURES, UNDER DIFFERENT CIRCUMSTANCES.

THE number of cases of stricture which have come under my care, since the first edition of this work was published, has been so great, that it now enables me to give instances of this disease under a variety of circumstances ; and to state the effects which the caustic has produced on different patients, upon a very extensive scale.

To make the detail of cases necessary for this purpose as little tedious, and as instructive to those who consult them as I am able, I have divided them into three separate Chapters, and subdivided each of these into a number of Sections.

Many of the cases are given in the words of the patient, with little or no variation

particularly the previous history. This might be inadmissible in a work which depended on the excellence of the composition ; but in one like the present, which has for its principal object the conveying to the public facts and observations on a particular disease, with perspicuity and fidelity, there did not appear to be the smallest objection to it.

The present chapter contains the different circumstances under which I have met with strictures, and the effects of the caustic in removing them.

SECTION I.

COMMON CASES OF STRICTURE REMOVED BY
THE EFFECTS OF THE CAUSTIC.

THIS Section contains cases illustrating the common effects of caustic, and the number of applications which were made before the cure was completed, these will be found to have varied very much in different patients.

From having found that cases in which the bougie had been long used were very difficult of cure by the caustic, I was led to suppose the continued use of the bougie was disadvantageous to this mode of treatment; this, however, a more extensive experience has shewn me is by no means true, since in some instances where no bougie had ever been passed, the cure has been as difficult as in many of the others.

CASE I.

A gentleman, about forty-six years of age, who had resided many years in India, discovered a stricture in the urethra, which was treated in the common way by the bougie ; and as soon as the dilatation had been carried to the extent the parts would bear, the bougie was left off, and the patient considered as cured. He was, however, put upon his guard, that probably after some time there might be a return ; and whenever that happened, the bougie must be again employed. He found that two months was the longest time that the stricture remained in the state in which the bougie left it ; beginning after that period to contract, and require dilatation. He went on in this way for four years, before I saw him ; I proposed that he should endeavour to carry the dilatation further, and bring that part of the canal nearer to its full size, which I had reason to believe would



make the returns less frequent. He did so ; but found that little was to be gained beyond what he had before effected. In December, 1794, finding the bougie incapable of producing a cure, he consented to make trial of the caustic. It was applied in the manner I have already described, and gave pain almost immediately on being introduced ; it was therefore only allowed to remain in contact with the stricture for a minute : the pain continued some hours, but was not severe. Next day some blood was discharged, and a degree of uneasiness was felt in the part. This made him suppose his case unfavourable for the use of the caustic ; but on the following day, a common sized bougie passed readily into the bladder without any pain, or producing the smallest degree of irritation ; nothing more was done, and the parts were left entirely to themselves. In May, 1795, five months after the application of the caustic, the same bougie was passed without meeting the smallest degree of resistance. In

July, 1795, he had a severe attack of cold attended with fever, and during the continuance of the indisposition, there was a degree of tenderness along the membrane of the urethra; and the bladder did not admit of being distended to its usual size; these symptoms, however, all went off with the others, and in August the same bougie passed into the bladder as readily as before, and has continued to do so.

The bladder and urethra having taken on a state of irritation, in consequence of general indisposition; and recovering themselves without bringing back the contraction in the urethra, is a strong circumstance in favour of the disposition for stricture being in this case entirely removed.

On January 22d, 1796, I attempted to pass a bougie, which I believed to be of the same size with that formerly employed, and found that it would not pass; this led me to conclude that the stricture had in a degree returned. I therefore applied the caustic, which, after remaining less than a

minute, went on to the bladder. Two days after I had an opportunity of comparing the bougie which passed formerly with that which had been now used, and found this last to be considerably larger; there was therefore no reason to believe that any thing had been lost, but that the passage had not before been enlarged so much as it ought to have been, although it admitted the bougies of the largest size in common use at that time, which in the course of a year's experience I found to be too small, and therefore employed them of a much larger size, without recollecting that those formerly used were so much smaller. This patient has had no return of the disease.

CASE II.

A gentleman between fifty and sixty years of age, who had been subject to a stricture for many years, and had been in the habit of using bougies, kept the parts by that means from contracting beyond a

certain extent; but as they were never completely dilated, the contraction constantly returned. In February, 1795, he came from the country apparently free from complaint, but found upon getting out of the post-chaise that he could not make water; which brought on great irritation upon the bladder; and in this state I first saw him. After straining for some time, he voided about half an ounce of urine, which relieved him a little; but the desire very soon returned, and he made the same quantity with similar exertions. I passed a small bougie into the bladder, and allowed it to remain there till the desire to make water came on; it was then withdrawn, and was followed by half a pint of urine, which made him quite easy. I explained to him the reason, why the bougie only gave temporary relief, and mentioned what appeared to me the advantages of the caustic: with these he was so well satisfied as to determine to give it a trial. He was directed to remain quiet the next day; and

on the day following the caustic was applied to the stricture; notwithstanding he was a good deal heated by the journey, and had some degree of general indisposition, his pulse being quick, his tongue white, and his sleep restless and disturbed, it brought on no irritation. The caustic was twice applied to this stricture, after which a common sized bougie passed through it; but a second stricture was met with about an inch and half further back; to this the caustic was applied four times, before the common sized bougie could go on to the bladder. The use of the bougie was not persevered in, and there has been no return of the stricture.

CASE III.

An officer from India, had for twelve years a stricture in the urethra, which brought on violent fits of irritation, and made him have recourse to bougies at dif-

ferent times through the whole of that period. The complaint however always returned, and he had given up all hopes of any permanent relief. But finding that some of his friends had received so much benefit from the use of the caustic, he wished to give it a trial.

In December, 1794, this mode of treatment was adopted. The caustic was applied three different times to the stricture before it was sufficiently destroyed, to allow a full sized bougie to be passed through it. In this case, as the complaint had been of very long standing, it was proposed that a bougie should be passed every day, and allowed to remain a few minutes in the passage, till the tenderness in the urethra from the use of the caustic should have gone off; this was done for ten or twelve days, and the bougie was then left off.

The bougie, for the first two or three days, brought on a good deal of irritation along the whole canal, which contracted with some force upon it; and on withdraw-

ing the bougie, it was found to have been tightly embraced by the urethra : this has happened in some degree in other cases, but not to the same extent ; the irritation however gradually went off. This gentleman being upon distant service, I have been unable to hear any thing of him for several months ; but when he left town he was free from complaint.

CASE IV.

A gentleman aged forty-six, suspected that he had caught a gonorrhœa, for which he applied to me for assistance ; the symptoms did not exactly correspond with those more usually met with in gonorrhœa ; I was therefore led to make a particular inquiry, and found them to be those of a stricture in the urethra. As he had been subject to irritation in the bladder, frequency of making water, and had for eighteen months been under the care of a surgeon

for a gleet, which gradually disappeared, about a year before the present attack; there was reason to believe the stricture had been formed for many years. I examined the urethra by means of a common sized bougie, and found a stricture there; to this I applied the caustic twice, and removed it, so as to allow the bougie to pass about an inch and half further on, where it was stopped by a second stricture; this had the caustic applied to it three times, and then a full sized bougie found a free passage into the bladder. The discharge and other symptoms all went off, and the patient remained free from complaint.

In this case, as well as in many others, there was a tenderness felt in that part of the membrane of the urethra, where the inflammation in gonorrhoea is commonly situated; this symptom is, I believe, the cause of many cases of stricture being misunderstood; but it is a very common sympathetic effect of irritation being produced

on the stricture, and subsides as soon as that irritation is removed.

CASE V.

A gentleman who had been some years in China, upon his return to England, had connection with a woman, and was supposed to have caught a gonorrhœa; but the symptoms were not removed by the usual means, and were afterwards discovered to arise from stricture. Upon having recourse to the bougie, the urethra was found to be extremely irritable, so much so that an abscess formed in perinæo, while he was under that course; this on leaving off the bougie got well; and by returning to it again, the stricture, which was about three inches from the orifice of the glans penis, was dilated: but after the use of the bougie had been continued for many months, it could not be retained in the canal without

giving very unpleasant sensations. On attempting to pass the bougie on to the bladder, another stricture was met with at the bulb of the urethra, which allowed a small bougie to pass, but did not admit of the necessary increase for its dilatation. So very irritable was the canal, that the surgeon, after having proceeded thus far, rather chose to leave the second stricture, than run the risk of bringing on irritation by continuing the use of the bougie.

In this state I saw the patient, and proposed the application of the caustic, both with a view to enlarge the second stricture, and make it less liable to return. I explained to him at the same time that I regarded this stricture as the original disease, and that which had been dilated only as a consequence of it. He said, he had no objection to try the caustic, but had great apprehensions that it would not succeed, from the uncommon degree of irritability of the membrane of the urethra, which his former

surgeon, a man of eminence, declared to be greater than he had ever met with.

On the twenty-fifth of May, 1795, I applied the caustic to the second stricture, the pain felt at the time was unattended by irritation, and was by no means so severe as he had formerly experienced in retaining in the passage a bougie, that had gone through the first stricture; it did not however go off for several hours after the caustic was withdrawn; a heat and uneasiness remaining in the canal during that period. On the twenty-seventh the caustic was applied again; and while I was pressing it against the stricture, the end of the bougie went through it, which made it necessary to withdraw the caustic: there was a slight degree of pain in the passage all day, and a little blood was discharged; on the following day, when he made water, there was a tinge of blood upon his linen; but not the smallest degree of irritation. On the twenty-ninth a full sized bougie passed

into the bladder without difficulty, gave no pain, and produced no irritation; it was allowed to remain a few minutes, and was then withdrawn. The next day he passed the same bougie himself with equal ease, and immediately withdrew it. He was advised to do the same for seven days, to keep the parts in that state till they had perfectly recovered themselves.

I saw him after this, and he told me that he was perfectly well, and felt now the truth of the remarks which I had made to him; for before the caustic was applied, he had been subject to erections in his sleep, attended with uneasiness, and sensations about the bladder, which he then supposed to be natural, as he had been long accustomed to them; but these were now entirely removed, and he passed his water more quickly than before, and without the usual degree of straining towards the latter part of the time.

On the eleventh of July he caught a severe cold, which brought on an irritation

upon the bladder and urethra, and the stream of urine was very much diminished ; this alarmed him a good deal : but it proved to be only a temporary complaint, for the same sized bougie passed readily into the bladder, and these symptoms disappeared as soon as the effects of the cold were removed.

In this case the bladder had been so long under the necessity of using great force in expelling the urine, that it took some time to adapt its action to the enlarged state of the urethra. When the patient had the desire to make water, the bladder acted so powerfully, that the urethra immediately dilated, being unable to resist its action and restrain the urine ; this put him to the inconvenience of voiding it at a very short warning ; the water was by these means so quickly expelled, that the bladder from habit continued to act for some time after it was emptied, and this contraction upon itself produced a degree of uneasiness. These symptoms in a few weeks went off.

CASE VI.

A gentleman who had been many years in India, and whose constitution had suffered severely from the climate, returned to England, in 1793, in a very bad state of general health, and with a stricture in the urethra. In India he had an ague for four years, and had affections of his joints, for the removal of which mercury was very freely employed; but without effect, and brought on an irritable state of body, from which he had never recovered.

For the stricture in the urethra, on May 10th, 1795, the caustic was applied. After it had been used four times, a common sized bougie passed through it; but another stricture was discovered a little further back in the urethra, to which the caustic was applied three times before the bougie could proceed to the bladder. The passing of the bougie was attended with some difficulty, and brought on a little

irritation ; the caustic was therefore applied a fifth time, after which the bougie passed readily. The bougie was now directed to be passed every day, for a short time, to prevent a return of the disease, and at the end of six days was left off. The use of the bougie had been attended with a slight degree of irritation, during the whole six days. Two days after leaving it off the patient was caught in a shower of rain, the weather at that time being very variable, and liable to uncommon and sudden changes of temperature, and caught a violent cold, which brought on a severe attack of ague, exactly like what he had in India ; an abscess now formed in the under part of the penis, on the corpus spongiosum urethræ, where it is covered by the scrotum. This showed that the ague was symptomatic of the irritation in the urethra, which brought on the abscess ; and it is highly probable, that the ague he had in the East Indies was caused by the stricture, which kept up a constant irritation in the urethra. The

ague returned very violently every other day, for eight days; the abscess now pointed just before the scrotum, and was opened by the point of a lancet: after this the ague went off, the inflammation subsided, and part of the urine came through the abscess, but by introducing the flexible gum catheter every time of making water, this was in a great measure prevented; and in a few days the external orifice healed up.

The stricture did not return; but it was thought right to use a full sized bougie, for several weeks, till the parts had entirely recovered themselves. It was afterwards necessary to continue the use of the bougie, introduced for a few inches, to prevent the urine lodging in that part where the abscess had communicated with the urethra; which happened whenever this precaution was not taken; this effect however gradually diminished, till it went entirely off.

In this case an abscess formed; but as it is the only instance that has been met with where such an event took place, and

as the first symptoms came on eight days after the last application of the caustic, and only two after using the bougie, it is with more propriety to be attributed to the irritation of the bougie, than any violence from the caustic: particularly as it is a very common effect of the use of the bougie when applied to an irritable urethra.

CASE VII.

An officer in the navy, twenty-five years of age, in the year 1790, while stationed in the Mediterranean, where he had been for some years, had a discharge from the urethra, which he considered as a gleet in consequence of a gonorrhœa: this was removed in about three months, under a course of injections, and a regular mode of living; and while he continued to live in that manner, he remained free from the discharge, and thought himself well. But in the year 1795, being thrown into situa-

tions that required exertions, which rendered his mode of life less regular, and impaired his general health, the discharge returned. As he supposed it to be the gleet returned, little attention was paid to it; and when I saw him, in the end of August, it was only mentioned accidentally as a proof of general weakness. This symptom I assured him was not constitutional, but was probably the effect of a stricture; in which opinion I was confirmed by his making water more frequently than is usual for persons in health to do, and from his having erections in his sleep, and involuntary emissions whenever he eat suppers, or drank a glass or two of wine beyond his usual quantity; which had been the case for the last year. I passed a bougie, and found a spasmodic stricture at the bulb of the urethra, which stopped it. I allowed it to remain there for a few minutes, and it went on with difficulty, attended with pain, there was also an impression of the stricture left on the bougie. I applied the caustic to

this stricture, three different times at the usual intervals, and the passage then admitted a common sized bougie. Finding that in other cases the passing a bougie, under these circumstances, brought on irritation, I did not propose the use of it, and left the parts entirely to themselves.

CASE VIII.

A gentleman about forty years of age had a stricture in the urethra, brought on in the East Indies, in which the symptoms of irritation increased to so great a degree, that he returned to England for the recovery of his health. When he arrived in London, he had been eight years afflicted by this complaint, and frequently in that time subject to strangury, from spasmodic affections of the stricture. He had recourse to the bougie, and persevered in its use for nearly three years: during the latter part of this time he attempted little more than

to preserve the passage in the state to which he had before been enabled to dilate it, which was only sufficient to admit a bougie about half the common size. In June, 1795, he was obliged to return to India, which made him think more seriously of his situation, and he was induced to try the caustic : it was applied twice to a stricture three inches from the glans, which it removed ; but another was discovered a little further on ; this second seemed to be in the membranous part of the urethra. The caustic, after being applied twice, appeared to have produced no effect ; but after the third time, the water passed more freely, and a degree of irritation which had come upon the parts went entirely off. The fourth time the caustic went through, and a full sized bougie passed into the bladder ; this was followed by an hemorrhage, that lasted the whole day in a slight degree ; the parts were entirely free from irritation, although in making preparations for his voyage he was obliged to undergo considerable fa-

tigue; this was attributed to the bleeding, which in other cases has produced a similar good effect. A bougie of a full size having passed readily into the bladder, he was advised to leave the parts for a few days entirely to themselves, as the bougie had been found in other cases to bring on irritation; he was afterwards to pass a bougie every day for a week, and let it remain a few minutes, to prevent the recurrence of the disease.

This precaution was considered as necessary, because the patient was going to a climate in which the disease is more liable to return, and the means of relief are less readily procured.

CASE IX.

A gentleman, about twenty-two years of age, in his way to Bristol consulted me in May, 1795, respecting a stricture in the urethra, and fistula in perinæo, to know how

far they could be connected with complaints in his chest, which were supposed to be of a serious nature. I was also to give an opinion upon the best mode of treating the stricture. In making the necessary inquiries, I learned that the use of the bougie had been begun under the direction of another surgeon, and every thing was going on very favourably ; I therefore had only to approve of the plan that was taken up, and to enforce a steady perseverance in it. He set off next day for Bristol, where he remained four months, and received much benefit in his general health ; he had also dilated the urethra till it very freely admitted the common sized bougie, which he continued to use for a fortnight, to prevent a return of the disease.

In passing through London in the latter part of September, he called upon me to say that he was perfectly well of the stricture. In the course of conversation, I advised him never to travel without bougies, as the disease was liable to return, and it

was therefore necessary to be upon his guard. He asked me to pass a bougie, and ascertain the present state of the parts, as it was nearly a month since he had passed one; I did so, and was surprised to find that it was stopped by the stricture, which had contracted so much in that time as not to admit a bougie of half the common size.

Under these circumstances, I did not hesitate to propose the use of the caustic; which he readily agreed to try, and it was immediately applied. The application was repeated four times before the passage allowed a full sized bougie to go through the stricture; it was however much larger than any that had been passed before. I then desired that the parts might be left entirely to themselves, and not disturbed by passing a bougie. In this state he went into the country.

CASE X.

A gentleman about thirty-five years old who was going upon foreign service, consulted me for an old gleet which was very troublesome, and which he was desirous to remove before he went abroad. The cause, upon examination, proved to be a stricture; and for the cure the caustic was employed. The use of the caustic was begun in September, 1795. It was applied twice to the first obstruction, after which the bougie passed about an inch further on to another obstruction; and when this second had been twice touched by the caustic, the bougie went on to the bladder; each application of the caustic was followed by a good deal of blood. The bougie that had been armed with caustic and made use of upon this occasion, after it had passed into the bladder, appeared to be too small to bring back the narrow part of the urethra in this patient to the natural size; it was

therefore proposed to arm a larger one, and repeat the application till the stricture should allow it a free passage. For this purpose, one, or probably two applications of the caustic were considered as all that could be necessary; we were however astonished to find that, after it had been applied three times in this way, nothing was apparently gained. This want of success led us to believe that a further continuance of its use would avail but little in increasing the width of the stricture; but the fourth application destroyed the remains of the obstruction, and this large bougie went on to the bladder. The caustic was once more applied, to make the bougie pass with greater freedom, and then the parts were left to themselves.

The use of the caustic in this case did not give the smallest uneasiness, beyond the local pain, which was neither violent nor of long continuance. This was in part attributed to the bleeding, which always relieves when it takes place.

CASE XI.

A gentleman, sixty-nine years of age, who had been many years in warm climates, had lived a regular life, and even in his youth had never suffered from venereal complaints; in the spring of 1795, was attacked with a violent inflammation along the whole internal surface of the urethra, extending over the glans penis, and inside of the prepuce. This complaint came on a few hours after toying with a young woman, with whom he had no further intercourse; and therefore could not originate from a venereal cause.

These appearances led me to suspect a stricture in the urethra, and my inquiries were directed to that point; but he declared that his water passed in a full stream, and not more frequently than is usual at that time of life; which led me to treat it as an irritation and inflammation, brought on by unusual action in the parts. The inflamma-

tion subsided, but the discharge continued for several months; but as it was attended with no pain, very little trouble, and could not be of a venereal nature, hardly any notice was taken of it. At the end of four months a new symptom appeared, the parts in the perinæum had become swelled, and were extremely tender when pressed; upon examination a small abscess had formed there, and had come so near the skin, that it burst while my finger was applied to it. This swelling had not the appearance of a recent inflammation, and the parts surrounding the membranous portion of the urethra, were hard and thickened, which could in no way be accounted for, but as the effect of a stricture; I therefore requested permission to pass a bougie, which met with an obstruction a little further on than the middle of the canal. The abscess in perinæo, as well as the former symptoms, were now very readily explained; they were all brought on by the stricture. As soon as the presence of a stricture was ascer-

tained, the patient, who was a very intelligent man, recollected many circumstances in proof of this obstruction having continued for some years, which till now he had attributed to other causes. I proposed the application of the caustic, as the best mode of treating it ; to this he readily acceded.

The use of the caustic was begun on the seventh of September, at which time there was a good deal of uneasiness in the perinæum ; this went off immediately after the first application, and the parts became less indurated than they had been before. The second application of the caustic destroyed this stricture ; but a little further on there was another, which had the caustic applied to it eight times, without any advance being gained ; the caustic however gave little or no pain, and the other symptoms were upon the whole diminished ; this induced us to persevere, and after the twelfth application the stricture was sufficiently destroyed to allow a common sized bougie to

pass through it ; as soon as this object was gained, the parts were left to themselves.

CASE XII.

A gentleman, seventy years of age, in May, 1794, had a suspicious connection, which brought on a discharge from the urethra ; this was supposed to be venereal, and treated accordingly by his surgeon. Under this plan the symptoms went off in a fortnight : and he considered himself as cured. On repeating the connection the same symptoms returned, which induced him to put himself under my care. I suspected the symptoms to be those of stricture, and my suspicions were confirmed by a bougie being unable to pass into the bladder. The case was now treated as a stricture, and the patient directed to take up the use of the bougie. Two strictures were met with ; but in three months the passage was so much dilated as to allow a

bougie of a common size to pass through both of them ; as the disposition for contraction is in this way difficultly removed, the use of the bougie was continued for a fortnight longer, to establish the cure.

In three months the disease returned ; and was treated as before, till the parts were dilated to the same extent as formerly. The patient now thought himself quite well ; but in less than two months had a relapse, for which I was again consulted.

At this time I had adopted the use of the caustic ; and proposed to make trial of it, as the benefit derived from the bougie was so short in its duration. In the beginning of the month of Sept. 1795, the caustic was used ; it was applied twice to the first stricture, and four times to the second ; by this means they were both removed ; after which the parts were left to themselves.

The caustic in this case gave no pain whatever ; the sensation produced at the time of its application scarcely amounted to

uneasiness. In twelve days it procured a passage for a larger sized bougie than could be admitted after three months had been constantly employed in dilating the parts.

CASE XIII.

A sailor, about forty years of age, who had been many years in warm climates, came into St. George's Hospital with a stricture in the urethra ; which did not readily admit the smallest sized bougie to pass. The caustic was applied to it three different times, after this a common sized bougie could be passed into the bladder, but not without difficulty ; this was used once a day, for two or three days together, a few minutes each time, but the bougie brought on a considerable degree of irritation, and was therefore left off. On the following day he had a total suppression of urine ; this symptom was relieved by opiate glysters, and he made water in small quantities,

but not without a good deal of straining. After the experience I had acquired, of the effects of the caustic in relieving spasm, I did not hesitate to propose its application for the removal of the present symptoms. With this view the caustic was now applied, about twelve o'clock at noon; the irritation during the evening and night was very much relieved, and next day it was entirely removed. On the following day a large bougie passed very readily into the bladder. This was used two, or three times, for a minute or two, and was then left off; the man was allowed to remain in the hospital for a few weeks, and at the end of that period having no return of his complaint, was discharged.

CASE XIV.

A gentleman, fifty years of age, had for three years been very much distressed by a difficulty in making water, for the remo-

val of which he had recourse to the use of bougies; at first he received considerable benefit from this practice, but afterwards became rather worse than before.

In the year 1796 he consulted me; and upon examination I found that there was a stricture three inches from the external orifice; this he said could not be, as he had no stoppage nearer than $5\frac{1}{4}$ inches, and another at $6\frac{1}{2}$ inches. He confessed, however, that once when he had passed a very small bougie through the last stricture, which he did with considerable difficulty, upon attempting to withdraw it, it was held fast, and could scarcely be withdrawn; after it came out, the bougie was nearly cut through at three inches from the external orifice. This I explained to him arose from the sympathy between the strictures; an irritation upon that next the bladder exciting an action in the stricture nearest the external orifice, so that it grasped the bougie, which it had never done before. The caustic was applied to this stricture at three

inches, which readily gave way; the two others in succession were also destroyed by six applications of the caustic. He made water in a better stream than he had done for many years, had no spasm, and left me, free from any complaint.

Some time after there was a return of spasm, and upon examining the urethra, it was capable of admitting a bougie three times larger than the one I used; so that the stricture had only been partially removed, and still required several applications of caustic of a larger size to destroy it.

CASE XV.

A gentleman, aged twenty-six, had a gonorrhoea in the year 1787, which lasted for a year, and was at last removed by the use of injections. From that period the urethra and bladder were more irritable than usual, and his water was voided at shorter intervals.

In February, 1789, symptoms came on which were supposed to arise from a recent infection ; but as they were mild and went off in a short time, I rather believe they were the consequences of an irritated state of the urethra.

In May, 1793, he had so much difficulty in making water, that some obstruction was suspected to have formed in the urethra, and a bougie was passed ; a stricture was met with, which only admitted the smallest sized bougie to go on to the bladder ; but in six weeks the passage was dilated by bougies to its ordinary size.

In October, 1794, he went a journey which heated him very much, and had a connection the same night, for the first time for some months. The irritation from the connection brought on a strangury, attended by very violent symptoms, which lasted for several hours.

This return of the stricture made him again have recourse to bougies, to restore the urethra to its former state ; they were

left off the 10th of Nov. 1796, and only passed once a-week to prevent a return of the stricture.

Under these circumstances I saw him; upon examining the urethra, the external orifice had a pouting appearance, and was very small, but was readily dilated, and admitted a bougie of a size larger than its apparent opening. The bougie passed on to the bladder, and was allowed to remain in the canal for a few minutes, to take an impression of any irregularity in the urethra; upon being withdrawn, there was an indentation marking half the circumference of the bougie on the left side, to the depth of one-tenth of an inch, about $4\frac{1}{2}$ inches from the external orifice; and the rest of the bougie to the point had the appearance of having been squeezed so much smaller.

It was evident from this examination, that there was a stricture at the distance of $4\frac{1}{2}$ inches. I was therefore led to believe, from my experience in other cases, that

there must be another nearer the bladder, which had allowed itself to be relaxed in consequence of the other being dilated.

I explained this to the patient, and told him that this stricture was first to be removed, and that afterwards we must act according to circumstances. The caustic was applied to this stricture, which was removed by two applications.

The bougie now passed with ease for $5\frac{1}{2}$ inches, where it met with a second stricture, which made an impression on the same side of the bougie, and to the same depth. This was removed by three applications of the caustic.

Another stricture was met with at $6\frac{1}{2}$ inches on the same side of the urethra; which required six applications to destroy it.

Six months after, there was no return of the disease: but the discharge continued.

The curious circumstance in this case is, that there were three strictures, all formed on the same side of the urethra, and only extending over one half of the circumfe-

rence. The pain from the caustic was inconsiderable.

Nine months from the application of the caustic, there was a return of the stricture. The patient had never been entirely free from a discharge, and a certain degree of uneasiness in these parts; but this was so much less than he had before, that he did not take notice of it.

From this circumstance I wished to ascertain whether the bougie that had been used was the full size of the canal, and found that a bougie much larger could pass readily down to the last stricture; so that in this case I had been misled by the appearance of the orifice, which had made me believe the canal smaller than it really was. The stricture therefore required being destroyed by armed bougies of a larger size.

CASE XVI.

A. B. aged fifty-eight, an out-door clerk to one of the large brewhouses in London;

an habitual drinker of spirituous liquors, had been sixteen years troubled with a difficulty in passing his water, and in that period had many alarming attacks of suppression. For six years he was in the constant use of bougies, and in 1795, the time I first saw him, he passed the smallest size with difficulty.

I made use of the caustic to three different strictures, which were all removed; but the number of applications necessary for that purpose amounted to fifty. The caustic gave less pain than in many other patients.

In 1797, he continued well, although no change had been made in his former habits of drinking, which are particularly hurtful in this disease.

CASE XVII.

An Austrian officer, forty-six years of age, came to England in the year 1796,

and put himself under my care, for the relief of a difficulty in making water, under which he had laboured for many years.

The urethra was very small, and there was an obstruction $3\frac{1}{2}$ inches from the external orifice; there was another at $5\frac{1}{2}$; and the whole canal had an uncommon disposition for contraction. Recourse was had to the use of the caustic, which gave a good deal of local pain, but produced no irritation. Its effects upon the strictures were uncommonly slow, so much so as almost to make me despair of success; I had, however, after one hundred and twelve applications, the satisfaction of getting a bougie into the bladder.

During this long period, no irritation, suppression, or constitutional affection was produced, the only inconvenience was, that at two or three different times the urethra refused to let the bougie pass, but next day admitted it.

In this case the cuticular lining of the urethra came away upon the surface of the

bougie, at different times, in small detached pieces. At one time the quantity was so great as in some measure to stop the canal. This was only met with near the time of the strictures being removed; and the same circumstance has occurred in other cases.

CASE XVIII.

A gentleman, forty years of age, had been troubled with strictures for fifteen years, during which period he had consulted the most eminent surgeons in London. He had used bougies under the direction of Mr. Pott, and afterwards had consulted Mr. Hunter. Upon examining the canal, and feeling the perinæum externally, Mr. Hunter said that the membranous part of the urethra was in a diseased state, was considerably thickened, and he could give him very little prospect of relief from the use of the bougie.

In the year 1796, he put himself under

my care. At that time he was very irritable, had considerable straining in making water, made it in small quantities at a time, and at short intervals. Upon examining the urethra, I met with a stricture at four inches from the external orifice, to this I applied the caustic; after six applications I got through this stricture, and the bougie passed on an inch and half further, and there met with a second stricture; this after twelve applications was also removed, but the bougie only passed a little way further on, and the end of the bougie had no regular impression made upon it. This was not satisfactory; but as the patient made water better, and all the other symptoms were a good deal relieved, there was sufficient encouragement to persevere in the use of the caustic. By doing so the bougie evidently passed further on, and the end of it had a flattened impression; in time an inch in length was gained, and the same length of the bougie was flattened and made rather smaller than the rest. He

now found that he made water very well, and considered himself free from all his former symptoms of disease.

I told him there was still something particular in his case. The part beyond the stricture was narrowed in consequence of having been long diseased, but it was gradually becoming dilated ; it was therefore necessary to persevere. When in this way we had gained an inch and half, the end of the bougie received a regular impression of a stricture, which explained the case, and shewed that the space between the stricture at five inches and a half, and another at seven inches, had been so much narrowed, and the parts thickened, that externally they felt hard to the touch ; it required the continued use of the caustic for a considerable time to make this space of the same width with the rest of the canal, after which the last stricture was destroyed.

It is curious that the caustic should be capable of producing this effect, as it cannot be supposed that the whole internal parts

were destroyed. The effect of the caustic must have also disposed them to relax, and fall back into their natural state.

This is a case which comes nearer to the idea of a long stricture than any thing I have met with, but certainly is not, properly speaking, of that kind.

The caustic in this case was applied in all about sixty times, before the last stricture at the end of this narrowed part was destroyed.

CASE XIX.

A gentleman who had resided ten or eleven years at Bombay, returned to England with a stricture in the urethra, which had been coming on for several years before he left India. The surgeon, under whose direction he placed himself, conceived the idea of overcoming the stricture by pressure, and instead of the bougie, passed a catheter down to the stricture, and made

use of some force in pressing against it. This mode of treatment brought on irritation, gave pain, and did not after some time afford any prospect of a cure. Having heard that the use of the caustic had proved more successful, the gentleman put himself under my care.

The stricture was situated near the bulb of the urethra : I had, therefore, every reason to suppose there was only one, to which I applied the caustic in Nov. 1794. After it had been twice used, a full sized bougie passed through, but did not go into the bladder. I suspected now that the prostate gland might be diseased ; but found upon examination that was not the case, and this second obstruction proved to be another stricture, which it is highly probable was the original. I applied the caustic to this second stricture five times before a middling sized bougie could be passed, and this by no means with ease ; the urethra was beginning to become irritable, and the weather was intensely cold ; these were

circumstances peculiarly unfavourable to his constitution, which even in India had been affected by the cold season of that climate, and was much more so by the winter here. Having relieved the immediate symptoms, I wished him to remain quiet, and only to pass a bougie for a few minutes daily for some little time, till we should see what would be the effects of a change in the weather, upon the local as well as the constitutional irritability ; and if the complaint was not removed under these circumstances, it would be necessary to return to the caustic.

Nothing was done for six months ; in which time the symptoms, instead of being lessened, were a good deal increased ; and the caustic was again resorted to. In returning to it, the second stricture only required to be removed ; the first, which had been completely destroyed, not having returned. The first time the caustic was applied it gave little pain ; but the second time the parts were all disposed to contract,

and I proposed that twenty drops of the tincture of opium should be taken, to diminish this degree of irritability, before it was again applied. This medicine had the desired effect ; for the parts were in a much more relaxed state, and a middle sized bougie was admitted into the bladder. This, however, was not considered as sufficient, and the application of the caustic was continued for ten or twelve times ; nor after all could a full sized bougie be passed, the canal at this part not being enlarged to the same width as the rest of the passage.

Finding that nothing more at present could be done, in August, 1795, he went to the sea, and found his general health much improved by bathing ; but the strictures were disposed to contract, and every four or five days he found it necessary to pass a bougie down to the last stricture, but he did not get through it, and if this was neglected the other began to lose ground. He went on in this way till January, 1796, when he came back to town

and put himself again under my care; and as the weather was uncommonly mild, it was agreed to try the caustic, and see whether it now could be persevered in so as to destroy this last stricture, which had hitherto baffled all our efforts. The first applications brought on a degree of spasmodic action of the parts as before, but this was prevented by opiates; after ten or twelve applications without the smallest progress, the end of the unarmed bougie was impressed by the stricture on one side only. This being observed, the caustic was opposed exactly to that part, it was made larger and longer, and after remaining about two minutes the stricture gave way, attended with a smart pain, and was followed by a considerable hæmorrhage, and a great deal of pain; but wholly confined to the part, not extending along the canal to the glans penis, as it used to do: the stream of urine was found to be larger than before. A second application made in the same way effectually removed this obstruction; the bleeding and pain

continued several days, after which a discharge came on, and they abated, and there was now a total absence of the irritation, which before had always been felt in those parts.

This however did not prove to be the last stricture, there was another three-fourths of an inch further on. This stricture had a larger caustic applied to it than is usually employed, and after five applications little was gained, but no irritation was produced; and the seventh effectually removed it, and a common sized bougie passed into the bladder. In destroying this last stricture, there was neither hæmorrhage nor irritation as in the others.

In this case the strictures were very difficult of removal, the caustic having been very often applied, and the time required was longer than in any case that I have hitherto met with. This perseverance was however in the end successful.

The three following Cases were communicated to me by Mr. Stephen Blackader, surgeon to the 99th reg. quartered at Dublin.

DEAR SIR,

Dublin, 23 April, 1795.

In consequence of your observations on the treatment of strictures in the urethra, I have been led to make use of the caustic, in the case of a soldier under my care. The case appears to me so extraordinary, that I have sent it inclosed ; and as I understood you mean to write upon the subject, you may, if you please, give it a place in your publication.

CASE XX.

Isaac Earl, private soldier in the 99th regiment, thirty-three years of age, having caught cold upon duty, was reported to me with the following symptoms ; very frequent desire to make water, which he passed

in a stream like a thread; and when he suppressed the desire, it came away involuntarily; at night he had frequent emissions of the semen. He said that two years before he had a gonorrhœa, and from that period his urine had been voided with difficulty.

Upon passing a middle sized bougie, I found a stricture about three inches from the glans penis; one of the smallest wax bougies passed through this, but was stopped by another stricture at the bulb of the urethra; a small catgut bougie, the size of the first string of a violin, passed through the second stricture into the bladder. I passed the catgut bougies for a few days, and the symptoms became rather milder. At this time I left the regiment to come to London, and sent the man into the Dublin infirmary. When I returned, I found my patient had been discharged from the infirmary, and was in a much worse state than when I left him. He now made water only by drops; and every ten minutes or quarter

of an hour had an attack of spasm or violent straining come upon the bladder, attended with excruciating pain. When his shirt, or any thing touched the glans penis, some urine came away involuntarily. On passing a full sized bougie, I discovered a stricture about an inch from the glans ; this might have existed before, as I had neglected in my first examination to pass so large a bougie. Profiting by your instructions, I applied the caustic to this stricture ; for five hours after the application of the caustic he had no desire to make water, and when the desire came on he made it more freely ; in the course of the night he only made water every hour. Next day a full sized bougie passed down to the second stricture, to which I now applied the caustic, this was done two days successively ; and so far was the caustic from producing irritation, that he made water seldomer, with less straining, and slept better at night. The caustic was omitted one day, and the day after a middling sized bougie passed also through this

stricture ; but as it was not sufficiently removed, I applied the caustic again to it a third time ; he made water only twice in the night. After touching the second stricture six times, I could pass a bougie through it of a moderate size ; he now made water with more freedom, and had seldom occasion to void it during the night. I passed the caustic down to the third stricture seven times, at intervals of two or three days ; this gave more irritation than when applied to the foregoing strictures, sometimes producing pain in the testicles, with frequent inclination to make water for a day or two ; but after the irritation subsided he always made water more freely, and less frequently. Still no bougie could be passed ; I therefore touched it three times successively, which gave but little uneasiness, and I could afterwards pass a small bougie. Next day the same bougie did not pass, and the second stricture was increased ; this led me again to apply the caustic to the second stricture, which I did five times, and at the

end of that period I found he made water much better, and a moderately large bougie passed into the bladder; so that the third stricture had been principally contracted from spasm, which was taken off by touching the second. In this state of the parts, the patient makes water tolerably freely, and says he is as well as ever he was in his life; nor can I persuade him to remain longer under my care; although the stricture is certainly not sufficiently destroyed; to render that part of the urethra of the same width as the rest of the canal.

I am yours, &c.

S. BLACKADER.

DEAR SIR,

Dublin, 10th July, 1795.

I mentioned to you in my last that I had another case of stricture under my care. As it is not so remarkable as the former the following abstract will be sufficient.

CASE XXI.

Joseph Crawford, about twenty-nine years of age, contracted a gonorrhœa about a year ago, and has had the usual symptoms of stricture ever since. When he applied to me he had much pain and straining in making water; and a small bougie could with difficulty be passed. Having applied the caustic five times, I could pass a bougie about the common size. He now made water pretty freely, but yet not so well as I should have expected from the size of the bougie; and it often came away in two streams: this I supposed to proceed from a small projection in the stricture, which made an indentation in the side of the bougie about the breadth of a straw. I have since endeavoured to destroy this projection, by passing as large a caustic as the canal would admit of, eight or nine times, but hitherto without success. Yours,

S. BLACKADER.

DEAR SIR,

Dublin, 12th Aug. 1795.

I have the pleasure of communicating to you another interesting case of stricture, which has turned out still more to my satisfaction than Earl's; though from the following account which the man gave me, I expected to have met with more disease than in the former case.

CASE XXII.

Robert Butler, private in the 99th regiment, applied to me on the 21st of July, for a difficulty in making water, which he passed drop by drop, with much pain and straining, and it often came away involuntarily, particularly when asleep. He told me he had the venereal disease, with a discharge and scalding in making water, about three years ago. He continued ill until he went into St. Bartholomew's Hospital about fifteen months after; at which time he had a swelling as large as a hen's egg in the pe-

rinæum, which burst, and the urine came through the orifice. He rubbed mercurial ointment on the part, and the orifice healed; after which he first remarked the difficulty in making water. On passing a middle sized bougie I discovered a stricture, about five or six inches from the glans penis. On withdrawing this, and passing one of the smallest size, I thought I perceived another stricture about an inch beyond the former. Next day I applied the caustic to the first stricture; and after six applications, I could pass a full sized bougie through it. I now plainly felt the second stricture, which was touched with the caustic five times; it gradually gave way, and I was enabled to pass a bougie of nearly the abovementioned size into the bladder. He now makes water pretty freely, though still frequently, about three or four times in the night; but it has almost ceased to come away involuntarily. After the application of the caustic, he sometimes could not make water for three or four hours, and sometimes with difficulty

till next morning ; but the symptoms were never at all severe. I passed it generally every second day.

Yours, &c.

S. BLACKADER

In a subsequent letter, dated in September, it is mentioned that he was perfectly well.

SECTION II.

CASES OF STRICTURE ATTENDED WITH AN
UNUSUAL DISCHARGE, WHICH WENT OFF
WHEN THE STRICTURE WAS REMOVED.

STRICTURES in some patients are attended with a very great discharge of matter from the urethra; and this symptom is often the only one that gives the patient the least uneasiness. These cases are commonly mistaken for gonorrhœa, or gleans, and this is the more readily done, as the passage admits a small sized bougie to go into the bladder; and passing bougies of that size does not remove the discharge beyond the time in which they are in use.

In those patients the stricture has not contracted in so great a degree as materially to impede the urine, but only to keep up a constant irritation in the urethra, inducing the formation of matter: that this is the

case is evident, for on the removal of the stricture the discharge in general ceases.

Cases of this kind have very frequently come under my care, and I could adduce a number of instances, but shall consider the following as sufficient to convey all the information deserving of attention.

CASE I.

A gentleman aged twenty-five, in Jan. 1792, contracted a gonorrhœa, which was so violent, from the degree of inflammation, phimosis, chordee, and pain in making water, that he was not able to use an injection till the month of April; he then used, by the advice of his surgeon, a strong injection of calomel, sugar of lead, and rose-water; this, about the middle of May, removed the inflammatory symptoms, and lessened the discharge; but after coition, hard drinking, or hunting, it was liable to return in considerable quantity. He bathed and took bark all the

summer and autumn, but to no effect. In June, 1793, he had a very violent discharge, without any one inflammatory symptom; for which he used a vitriolic injection, composed of sixteen grains of white vitriol, and six ounces of elder flower water, mixed up with a little gum arabic, which he injected every hour in the day, for three weeks; this stopped the discharge, except that when he committed any excess, it was liable to return. In May, 1794, the discharge became very great, without the least inflammation; the same vitriolic injection was used as before, and the discharge again diminished; he then took large doses of bark, and balsam of Tolu, copaiva, and Canada balsam; he also bathed all the summer, but the discharge never disappeared for more than a month at a time. While he was hunting in the October following, he leaped over a five-foot wall, into a gravel pit, which brought on a swelled testicle, inflammation of the spermatic chord, and a pain in the back, also a pain in the perinæum. The swelled testicle was

cured by cold applications; but he did not venture to hunt till Jan. 1795. A small discharge now and then appearing, his surgeon introduced a bougie, and said he had a stricture; but after a course of bougies for three weeks, he told him he was perfectly well. The discharge returned in May, 1795. He came over to London, and put himself under the care of a surgeon, who gave him an injection, which stopped the discharge in six weeks; he was, however, subject to a return every two months, but the injection always stopped it again in a few days. In May, 1796, he had a copious discharge, without inflammation, which was treated as a gonorrhœa, till about the 12th of June, when, on passing a bougie, the surgeon found a stricture, and kept him under a constant course of bougies, wearing them for twelve or fifteen hours a day, till July 21st. The bougies were never introduced beyond six inches and a half down the urethra. July 21st, he had evident symptoms of a swelling in the same testicle which

was affected in 1794. He used constant applications of goulard, which allayed these symptoms in three days. He then used bougies again, gradually increasing the length of their application, till he again used them from twelve to fifteen hours a day, till the 12th of August; from that time he diminished the period of their application till the 22d, when, though he had a considerable discharge, the surgeon said that he was perfectly well of the stricture, that he need not fear its return; and that bathing, with the use of the injection before employed, would remove the discharge in a very few weeks. On the 24th of August he went to the sea, and bathed every second day till the 21st of September, without benefit. This induced him to return to London on Friday, Sept. 23d, and put himself under my care.

I found a stricture, and recommended the use of the caustic, to which he readily agreed, and it was immediately applied, and repeated every other day, without giving

any violent pain, or producing inflammation. On the second of October the first stricture was removed, and the caustic applied to another at $6\frac{1}{2}$ inches; this created unpleasant sensations about the bladder, so that it was necessary to quiet the parts by spirituous applications, and to give opiate medicines. Under this treatment he was well enough to bear another application of the caustic on the 5th, again on the 7th, and on the 9th, when the bougie went with ease into the bladder; on the 11th this was repeated, and the caustic passed through the stricture, after which it was left off. There was a good deal of bloody discharge for some days; on the 17th the discharge was less bloody, and less in quantity. A fortnight after, the discharge was nearly gone; a month from the last application of the caustic, the bougie passed with ease into the bladder. The discharge ceased; and I have heard from him, many months after his leaving town, and there has been no return of discharge, or any other symptom.

CASE II.

A gentleman, thirty-two years of age, had a discharge of matter from the urethra for five years, which was believed to have its origin from a gonorrhoea. He had at the same time occasional difficulty in making water. All means that could be devised for stopping this discharge had been tried, and proved ineffectual. These were injections of various kinds, internal remedies, and the use of the bougie, also the baths in Italy, strongly recommended for that purpose, and sea-bathing.

After having done every thing that had been suggested to him, without receiving more than a temporary benefit, he began to reconcile himself to his situation ; but upon hearing of the effects of the caustic in removing strictures, and conceiving his symptoms might all arise from that cause, he consulted me upon this subject.

On passing a bougie, I found that the

urethra admitted one of a very large size, which readily passed $6\frac{1}{2}$ inches, where a stricture had formed. This was destroyed by the caustic, but the symptoms were not removed. Another stricture at $7\frac{3}{4}$ inches stopped the progress of the bougie; this distance exceeded what I had usually met with, and led me at first to suspect some disease independent of stricture; but as the penis was uncommonly long, the distance of the stricture was accounted for. Every time the caustic was applied to this last stricture the parts bled, but only in small quantities; after six applications the patient had an attack of strangury, which continued twelve hours, and was removed by repeated doses of opium, and keeping him warm in bed. When the strangury went off he was left quiet for a few days; the bougie was then passed, and went readily into the bladder, the discharge gradually ceased. I passed the bougie a week after, and again in a fortnight, when it was admitted very readily,

nor have I since heard of any return of the discharge.

CASE III.

A gentleman, twenty-five years of age, had a gonorrhoea followed by a gleet, which resisted all the means employed for his relief; these consisted in injections, the internal use of the balsams, sea-bathing, and wearing bougies.

After persisting in these means for three years without effect, he put himself under my care. I found a stricture at five inches, which I destroyed by the caustic; there was another at $6\frac{1}{2}$ inches, this had seven applications of the caustic made to it without producing any degree of irritation, although he rode on horseback every day, and even mounted his horse immediately after the application. This liberty was contrary to my advice, he therefore did it at his own risk. After the eighth application

he called upon me on horseback, to acquaint me that he could not make water. I attempted to pass a bougie, but without success. I applied the caustic, and in five minutes he passed his water: he was induced in consequence of this alarm to give up horse exercise; after three more applications, the stricture was removed. He still had a great discharge, and went to the sea and bathed, he also took the balsam copaiva in large doses, but these means had no effect. In six weeks he went into the country, and pursued his usual exercises, which were principally on horseback, and the discharge disappeared; nor has there been any return either of the discharge or stricture, as I have had an opportunity, a year after his recovery, of passing the same bougie with ease into the bladder.

In general, where the discharge from the stricture is great, it requires a month or six weeks after the use of the caustic has been discontinued for the discharge entirely to disappear.

CASE IV.

An officer in the navy, thirty years of age, had a discharge from the urethra, straining after making water, and a frequency in voiding it, which continued for three or four years. In 1796 he put himself under my care. In the investigation of his complaints I found two strictures, one at $5\frac{1}{2}$ inches, the other at $6\frac{1}{2}$ from the external orifice; these were readily removed by the caustic, and the frequency in making water, as also the straining after it, entirely ceased; but the discharge from the urethra continued. He went down to the sea, but after remaining there for three months, came back to town without any abatement of the discharge. I now suspected the stricture had not been completely removed, but the bougie passed readily into the bladder. I then tried the effect of a larger armed bougie passed through the stricture, but still the discharge con-

tinued. The balsam copaiva had no effect; the bougie anointed with balsam copaiva and olive oil, and passed a few inches every day for ten minutes, did not remove it; and I believe it still continues in a small degree.

SECTION III.

CASES OF STRICTURES WITH A THICKENING
IN THE CANAL, FORMING A SWELLING,
WHICH SUBSIDED WHEN THE STRICTURE
WAS REMOVED.

IN some cases of stricture there is a thickening of the parts, forming a small tumour. The stricture is commonly about four inches from the external orifice. This tumour, when it occurs in that particular part of the canal, I conceive to arise from one of the lacunæ of the urethra being close to the stricture, the coats of which have been inflamed, and remain in a thickened state.

My reasons for adopting this opinion are, that in four cases in which I have met with it, the situation in the canal has been the same, and in a part of the urethra where a lacuna is naturally situated. The tumour in all of them was on the lower side of the

urethra. I have also met with similar swellings in consequence of the use of injections in cases of gonorrhœa, in warm climates; they were in the same part of the canal, and gradually subsided when the inflammatory symptoms went off.

It appears from the following cases, that this swelling, from whatever cause it arises, subsides after the stricture is destroyed by the caustic. Such swellings, therefore, instead of being an objection to the use of the caustic, are reasons for employing it.

These tumours may arise from a thickening of the parts simply; for I have met with a tumour of this kind in the perinæum, which I suspected to be a small stone lodged there, but it was entirely destroyed by the use of the caustic.

CASE I.

A gentleman, fifty-seven years of age, who had resided chiefly in the West Indies

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since the year 1764, during which time he enjoyed a very good state of health, returned to England in May, 1792; he caught a severe cold on his arrival, and continued feverish and unwell for six months; from that time till August, 1795, he had very good health; he was then seized with a violent pain in his side whenever he made water, which he voided frequently in small quantities, and the effort was attended with great pain. The urine was extremely thick, and had a white sediment, which induced his surgeon to pronounce the complaint to be in the kidneys: he gave him the Canada balsam which afforded relief, but when he drank more wine than common the symptoms returned. This happened repeatedly in the course of the year.

In June, 1796, he visited a friend at Portsmouth; while there he found occasionally his water did not come in a full stream, but dribbled on his shirt after he thought he had done. On his return to town, the 18th of the month, he had re-

course to his former medicine, and got so much better, that he set off for the North of England on the 25th of July. He was perfectly well during his journey. On the 3d of August he dined with a friend, in the evening felt extremely unwell, and his water was very thick ; he had recourse to the balsam, but received no benefit from it. On the 12th, he went to an assembly ; while there he found his bowels very much out of order, and as he was returning home at twelve o'clock felt an inclination to make water, and just as he had done was seized with a violent spasm, which gave him so much pain that he was hardly able to stand. He took some warm negus and went to bed. At three o'clock he awoke in agony, and every time he attempted to make water the spasms returned, and nothing came but blood and mucus : relief was procured by taking opium in large doses. The water came from him all night involuntarily, which obliged him to change his linen thirteen times. He remained in this state

till the 1st of September, when he found his health so much impaired, from pain and low diet, that he began to apprehend if he did not attempt moving homewards, he should soon be too much reduced to undertake so long a journey. He therefore set off for London; while travelling he found himself no worse for the motion of the carriage.

He arrived in London, September 14th, and the next day consulted me.

When I first saw him, the external orifice of the penis was so small, that with difficulty it admitted the point of the smallest sized bougie that is made. I was therefore induced to apply the caustic to the orifice, and after two or three applications, got it enlarged so as to admit an armed bougie to the first stricture, which was only an inch from the external orifice; when applied there it gave great pain, which lasted near an hour; the spasms and other symptoms were not diminished, and required the constant use of opium to relieve them; there

was a second stricture at the distance of three inches ; before these two were destroyed, the caustic was applied forty-six times. The bougie now passed four inches, where there was a tumour formed, of the size of a common pea, which could be felt externally ; to this the caustic was applied ; it gave less pain at this part, so that it could be suffered to remain a much longer time. In twenty-six applications this was destroyed. At $6\frac{1}{2}$ inches there was a third stricture, which yielded to two applications, and the bougie went on to the bladder ; a flexible catheter passed with equal ease ; its use was then left off, as the patient was free from all his former symptoms. Ten days afterwards I passed the same bougie without difficulty, and he went into the country.

CASE II.

A gentleman, aged about thirty-five, had for several years a difficulty in making

water, and had been very often seized with a complete stoppage of urine. He had given bougies several trials, and suffered all the inconveniences they produce; he had even been confined for six months at a time to give them every advantage; but was unable at last to pass one larger than a knitting needle, and that did not go on to the bladder.

Under these circumstances he put himself under my care, in March, 1796. There was a stricture about two inches from the orifice; this was with very great difficulty removed, requiring ten or twelve applications of the caustic; a second was met about four inches, and at this part there was a tumour which could be felt externally, the size of a large pea. After getting through this, which required a great many applications, I was unable for a long while to enlarge the canal at this part beyond a certain size, but by increasing the diameter of the caustic, which was allowed in one application entirely to dissolve there,

the tumour began to diminish in size; and in three months from his being first under my care, during which time the caustic was applied to it forty times, it was almost entirely gone. During this time he had several attacks of inflammation of the throat; these were suspected by some of his medical friends to be venereal. But I requested him not to use mercury, and they went off without any particular means being used for that purpose.

A bougie now passed into the bladder, and I left the parts to themselves; but a week after, on attempting to pass a bougie, I found a stricture at six inches, which from its connection with the other, had been relaxed, but afterwards contracted again. The caustic was applied to this stricture several different times, and when the bougie got beyond it, there was the feel of a hard substance, which made me suspect a small calculous concretion was lodged behind it, keeping up a degree of irritation in the canal; this however was not the case.

As soon as I was able to pass a bougie freely into the bladder, I endeavoured to introduce a flexible gum catheter, but could not succeed. By persevering with the caustic two or three times more, I was able to pass a catheter, and in a future trial got the patient to do it himself, which I recommended him to practice, with the view of promoting absorption in the thickened parts by its pressure while lying in the canal.

The passing a flexible gum catheter, and leaving it in the bladder, at first view appears a more harsh application, and more liable to irritate than a bougie; it may therefore be objected, that I condemn the mild application of a bougie, while in particular cases I recommend a harder one: but the advantage of the catheter is, that the bladder can be emptied by it whenever there is the slightest irritation. This it takes off, and leaves the parts in an easy state, which is not the case with a bougie. It will be found in several of these Cases that expe-

rience is in favour of the catheter ; the same urethra which could not bear a bougie for half an hour, will allow the catheter to remain for many hours without the smallest inconvenience.

The gentleman who is the subject of this Case has had no return of his complaints a year after he left me, and the disposition to ulceration in the throat has been entirely removed ; so that it is highly probable the former attacks were brought on by the action of the caustic on the stricture, irritating the constitution, and inducing that complaint. I have met with another instance of stricture, where a similar affection of the throat came on while the caustic was used, it returned several different times : but as I attributed it to the effects of the caustic, it gave no alarm, and always went away under the most simple modes of treatment.

CASE III.

An officer, forty years of age, in the year 1793, while serving on the Continent under the Duke of York, contracted a gonorrhoea, for which the surgeon whom he consulted gave him an injection of corrosive sublimate. Its strength by mistake was much beyond what it ought to have been ; and the immediate effect was a very severe irritation about the middle of the canal ; nor was it probable that the injection passed beyond that part, for it was immediately thrown out again, and the pain was such as to forbid a repetition. He was seized with a strangury, which after some hours went off, and he gradually recovered from the inflammation that had taken place in the urethra.

From that time he had been unable to pass his urine otherwise than in a very small stream, often attended with difficulty, and always more frequently than before.

These symptoms distressing him very

much, and having in vain had recourse to the use of the bougie, which had only relieved the temporary suppression of urine, he put himself under my care in the year 1796. When I first saw him, the external orifice was so extremely small, that I was unable, without difficulty, to introduce a bougie large enough to carry caustic. I was therefore obliged to apply the caustic to the external orifice ; this was done twice before I could pass it, but when I had done so, I got three inches before I met with a stricture. In applying the caustic to this stricture, I was sometimes able to get down to it, at others the bougie stuck upon the orifice, which was oblique, the external opening not being exactly in the direction of the canal, so that after entering it, the first direction it took was downwards, and then horizontally along the urethra. After five or six applications to the orifice, this was got the better of, and I was able with a little management to direct the bougie to the stricture at three inches.

This stricture gave way to four or five applications of the caustic; another was met with at four inches; when feeling this stricture with the finger and thumb through the substance of the penis, there was a knob or lump distinctly felt where the bougie stopt. The caustic was applied to this stricture, it gave a good deal of pain, and the uneasiness it produced remained some hours; if he went out or took any exercise it brought on a strangury, which was relieved by passing a very small catgut bougie through the stricture; this occurred seven or eight times, and was generally the consequence of exercise or exposure to cold; it was unaccompanied by any kind of sympathetic irritation, as ague, headache, loss of appetite, or affection of the bowels. To this stricture the armed bougie was applied above twenty times before it passed through it, and there was reason to hope that no obstruction existed beyond it; but one was met with at $6\frac{1}{2}$ inches. This, however, was not attended with the

same difficulty, for five or six applications procured a passage into the bladder.

The urethra was very unusually small in its natural state. I was therefore induced, after the canal was made pervious, to get him to pass a flexible gum catheter, nearly of its full size, every day for a fortnight, to prevent the parts as much as possible from renewing their disposition to contraction, and I understand he has continued free from complaint above a year after being under my care.

CASE IV.

A gentleman, forty-seven years old, consulted me on account of strictures in the urethra of many years continuance. The following is the history of his complaints.

At the age of sixteen he contracted a gonorrhœa, which was difficult of cure, and it was nearly six months before it was removed; when only seventeen he perceived

his stream of urine evidently diminished, but had no difficulty in passing it; when he was twenty-two the stream was rather smaller, and occasionally there was straining for a short time before it could be made to flow. This symptom alarmed him, and induced him, at the age of twenty-five, to have recourse to the use of the bougie. At first he applied to it, with the hope of obtaining a cure; but after repeated trials, found no permanent effect was to be expected; it was, however, necessary from time to time to have recourse to it whenever the difficulty in making water brought on irritation upon the bladder.

After using the bougie occasionally for twenty-two years, he consulted me on the propriety of using the caustic. He was of a very irritable habit, liable to a violent degree of inflammation from slight causes, and had been, in every sense of the word, a free liver. These circumstances, however unfavourable in themselves, were not particularly so to the use of the caustic, I there-

fore saw no objection to that mode of treatment.

On the 10th of May, 1797, I examined the canal, by passing a bougie, and found that one of a small size could only be passed one inch and a half. To this obstruction I applied the caustic; and after three applications, once every other day, the bougie went through it, but was again stopped at 4 inches. To this second stricture, the caustic was applied, in the same manner, seventeen times, without producing much effect upon it; but by feeling the urethra externally, this was readily accounted for, as there was a hard tumour at that part, the size of a small pea; the parts had become so tender, that the caustic was not used for fourteen days; it was then applied three times, and omitted for nineteen days; after which it was used eight times, and the bougie passed through the stricture. To effect this required twenty-eight applications. The urethra was so tender where the tumour had been, that it was fourteen days before it

could bear the bougie passing over that part.

Another stricture was found at the distance of six inches, which yielded to three applications; and a fourth at seven inches, which also gave way, after the caustic had been thrice applied to it.

He now made water with less effort than he had done for many years, and less frequently; but the caustic was several times applied, with a view of removing entirely the strictures, and making them less liable to return, as the urethra, either naturally, or from long being habituated to a contracted state, was of a small size. The caustic was applied in all about fifty times.

CASE V.

A gentleman, forty-six years of age, who had resided twenty years in India, and for the last fifteen years had been subject to an irregular ague, caught in a hilly part of

India, where strangers are liable to fevers. This disease continued upon him for several years, but, on leaving that district, went off. He had, at the same time, frequency in making water, attended with straining; this was attributed to an ill-treated gonorrhoea, and it was supposed would soon go off, but continued in a greater or less degree from that time.

Five years ago, he returned to the same place, and was again attacked by the same aguish complaint, which was more violent than it had been before, and the difficulty in making water extremely severe; he had frequent suppressions of urine, which were relieved by warm baths, the passing bougies, and various other means. His health gradually declined. For the last three years he made water every half hour, for twenty-four hours before the fever came on, and during its continuance; but next day only once in twelve hours, after which the frequency returned as before.

In the year 1796, he was ordered to leave

India, as the only mode of preserving his life. He arrived in England in 1797, and consulted a physician for the feverish complaints he had so long laboured under, and which he believed to be his only disease, as the medical persons who attended him in India had no suspicion of there being any other. The physician asked him how often he made water; he said he was obliged to do it ten or twelve times a night. This led to the idea of his complaint being in the urethra, and the fever only a symptom arising from the effects of that irritation on the constitution. Upon this idea I was sent for to ascertain the state of the urethra. I found a stricture $4\frac{1}{2}$ inches from the external orifice; to this I applied the caustic; and it is curious, that after the second application, he had less feverish indisposition; and by the time the first stricture was destroyed, it was almost entirely gone; and his bowels, which had been in a disordered state for two years, had become regular without the assistance of medicine. He made water

less frequently, with less straining, and began to improve in his general health. Another stricture was found to stop the bougie at $5\frac{1}{4}$ inches; this was also destroyed without bringing on any symptoms but local pain; a third stricture was discovered at $6\frac{1}{2}$ inches, and beyond this there was a tumour about the size of a large pea, which could be readily laid hold of between the finger and thumb, when the parts in the perinæum were relaxed. The feel was so distinct, that I had little doubt of its being a small calculus lodged behind the stricture; it proved, however, to be only one of those tumours from thickening of the parts, for as the stricture gave way it diminished, and at last was not to be distinguished. This stricture required twenty-six applications to destroy it; after which the bougie went into the bladder, but in passing over that part gave great pain. Before this stricture was entirely destroyed, the applications of the caustic brought on an attack of fever, and a want of power to pass the urine for

six hours. Nor did this irritated state of the general system subside till the stricture was entirely removed, which was not till a fortnight after.

The caustic was applied in all about fifty times.

SECTION IV.

CASES OF STRICTURE WITH FISTULÆ IN PERINÆO, WHICH HEALED WHEN THE STRICTURE WAS REMOVED.

STRICTURES produce abscess in perinæo, which opens externally, and this opening gives a passage to the urine; nor can it be healed up while the obstruction remains in the urethra, and prevents the urine from passing readily in its natural course.

Upon this principle, which is I believe very generally understood, the only treatment of such fistulæ in perinæo is the dilatation, or the destruction of the stricture.

The following Cases are given in proof of this doctrine; they at the same time shew, that where fistulæ in perinæo have been formed, the parts behind the stricture are so much thickened, and are rendered so indolent,

that the common bougie is unable to dilate them; and the lower surface of the urethra, in consequence of inflammation and ulceration, where the fistulous orifices have their origin, is rendered so irregular that a bougie cannot readily pass over it. If this is not understood, the surgeon may be led to mistake the case, and suppose that there are other obstructions which prevent the bougie from passing on. The flexible gum catheter is therefore, in such instances, the only instrument by which the real state of the canal can be ascertained; since, when introduced with a stilet of metal which is bent to the curve of the urethra, the point of the instrument is always directed upwards, and avoids any irregularity on the lower surface which might obstruct it.

CASE I.

A. B. aged forty-four, had, in the year 1775, an obstruction to the passage of his

urine, which was so considerable as to make him apply for medical assistance. He was directed to use the bougie, and when he began that course, one of the smallest size only could be passed; it was, however, in the course of some months, increased to a larger size, so as to allow his urine to pass with tolerable ease, and then it was left off. After some time the obstruction returned, and the same mode of relief was resorted to, but the passage did not admit of being dilated beyond the middle sized bougie. In the year 1785, during one of the returns of the obstruction, the scrotum became swelled, but subsided again when the obstruction was removed. The patient found, however, that he could not bring the canal to the same size as before, gradually losing ground in his endeavours to dilate it by the bougie, his stream of urine being smaller, and the desire to make water more frequent. In July, 1794, an abscess formed in perinæo, attended with a considerable swelling of the scrotum; the abscess broke, and

part of the urine passed through the external orifice, which gave him immediate relief; a fresh inflammation some time after came on, attended with much pain; this also abated upon its breaking and discharging the matter and urine externally. A repetition of this process brought on an irritable state of the parts, and he became unfit for any exertion, the least exercise bringing on pain and irritation. The scrotum was, from the repeated inflammations, become much enlarged and thickened. In these circumstances he put himself under my care in the month of July, 1795. I explained to him that the only mode of relieving his present symptoms was to bring the canal to its natural size, which could not be done by the bougie; I therefore proposed the use of the caustic. I passed a large bougie, which met with an obstruction not much more than two inches from the external orifice; to this the caustic was applied, and on the next trial the bougie passed down about three inches, to a second obstruction;

the caustic was applied here three times, after which the bougie of a full size went on about four inches to a third obstruction. The symptoms were now very much abated; the irritation to make water was less violent, and considerably less frequent, not recurring more than twice in the night, whereas before it had come upon him every hour. The caustic was applied to this third stricture seven times before the bougie went into the bladder, and as soon as this was effected, the water ceased to pass through the fistula; the scrotum became gradually less, till it was nearly reduced to its natural size; and he did not void his urine oftener than is commonly done in health. It was thought right, from the length of time the disease had continued, to use the bougie for a few minutes every day to establish the cure; but the bougie gave pain, and the second time of being used brought on irritation, followed by a disposition for inflammation in the perinæum; it was therefore left off, and the

caustic again applied till the full sized bougie passed readily; and then the parts were left to themselves.

I saw this patient three months after the caustic had been used, and a common sized bougie then passed into the bladder; in other respects he felt himself perfectly well.

CASE II.

A. B. a bricklayer, about forty years of age, came into St. George's Hospital in August, 1795, with a stricture in the urethra, several fistulous orifices in the perineum, and one upon the under surface of the penis, before the scrotum; through these openings the urine passed, hardly any being voided by the natural orifice.

He gave the following history of his complaints: eighteen years before, he had fallen from the top of a chimney, and pitched upon the ridge of the house, with his legs astride; by which means the scrotum and

perinæum were much injured. These parts recovered themselves without proceeding to suppuration.

Ever since that time he had found a difficulty in passing his urine, and twelve weeks before I saw him, after having undergone considerable fatigue, an abscess formed in perinæo, which burst, and discharged blood and urine. Three weeks after another abscess formed, which opened externally before the scrotum; this also gave a passage to the urine; and when the urine insinuated itself into these sinuses, the pain was excruciating.

When he came into the hospital, he made water every ten minutes through the fistulæ, had a considerable degree of straining in the bladder, and tenesmus in the rectum. The external skin of the scrotum and its neighbourhood, was excoriated by the urine.

On passing a bougie, it met with no difficulty till it reached nearly to the bulb of the urethra, and there it stopped. The caustic was applied to this stricture, after

which he had less irritation in the bladder; this was repeated, and the stricture gave way, allowing the bougie to go an inch further, where it was again obstructed; to this second stricture the caustic was five times used, and a full sized bougie was passed into the bladder; but before this was effected the symptoms were very much abated.

The number of fistulous orifices, and the readiness with which the urine got into them, made it necessary to introduce into the bladder a flexible gum catheter, which was retained in the urethra, and the urine thus prevented from getting into the fistulæ. It could not however be retained above a day or two, without giving uneasiness; it was therefore, from necessity, occasionally removed. At the end of eight weeks the fistulæ near the anus and those in perinæo were healed, that only before the scrotum continued open.

This stricture, brought on by an accident, and of eighteen years continuance,

was entirely removed in fourteen days, by means of the caustic.

CASE III.

A gentleman, aged twenty-three, in the beginning of the year 1769 was attacked with a violent gonorrhœa, attended with heat of urine and violent chordee, which continued without relaxation for twelve weeks. At the end of about six months the stream of urine lessened, and as there was reason to suspect the formation of stricture in the urethra, a bougie was introduced, and he was desired to let it remain for some time; but from the great irritation it occasioned, he could not bear it more than a few minutes. On withdrawing it the urine flowed more freely, but not with less pain. From this time the bougie was passed once every twenty-four hours, for some months, when a suppression of urine took place, and not a drop could flow till the passage was forced by

a bougie; he was now obliged to pass one every time he made water.

About the year 1774 he was recommended to apply to Mr. Hales, who, on passing a bougie, assured him he would effect a cure, and gave him some bougies for that purpose; these he used for a considerable time, without any benefit.

In the year 1778 the stricture became more contracted, and the painful symptoms increasing, attended with a tenesmus, he applied to Mr. Hunter; who after examining the prostate gland, declared his cure to be in his own power. This assertion induced him to put himself under Mr. Hunter's care, who made use of the lunar caustic, passed through a canula, to a stricture at $6\frac{1}{2}$ inches from the external orifice; but no material benefit being obtained after applying it twenty-one times, he gave it up, and recommended the use of the bougie as before. About the year 1784, the passage was so much contracted, as not to admit the smallest bougie, and no urine flowed for

more than forty-eight hours, notwithstanding the common and approved remedies of the warm bath and opium were made use of. Of tincture of opium, one hundred and twenty drops were given in twenty-four hours. When nearly all hopes were at an end, by good fortune a small catgut bougie found the aperture, and the urine followed; after this a great discharge of brown coloured mucus passed from the bladder with the urine, attended with an aching pain and frequent solicitations to make water. The mucus was equal in quantity with the urine, and gave it a pungent volatile smell. The bougie could now pass as before; the mucus gradually diminished in quantity, and in about ten days disappeared. This symptom has attended the going off of every paroxysm of the complaint.

About the year 1789 he applied to Mr. Pott, who recommended him to be satisfied with passing the bougie, and told him that he never knew any relief obtained by the use of the caustic.

The complaint increasing, and the total suppressions of urine becoming frequent, about 1791 he desired his case might be sent to a surgeon in London, who, after due consideration, sent him some bougies, armed by having nearly an inch of their points covered with powdered lunar caustic, which he desired might be passed through a canula (sent for that purpose) into the stricture; this was done without much benefit. In April, 1795, he was again attacked by a suppression of urine, attended with a violent strangury, symptomatic fever, loss of appetite, and continual nausea, by which he was confined to his bed for three weeks: this was followed by a swelling of the left testicle, and a considerable enlargement of the epididimus. These symptoms abated in the usual way, by a great discharge of mucus from the urethra and bladder, and also by a discharge of a considerable quantity of opake, white, gritty matter. In June, 1795, he was attacked with a most violent pain in his back, which confined

him almost constantly to his bed for three months; for this symptom he was advised the use of the warm bath, electricity, bark, &c. but without effect. In January, 1796, he was attacked with a swelling near the rectum, occasioned by the urine escaping into the cellular membrane every time he made water; this swelling increased, with a violent smarting pain, and by degrees it extended along the perinæum as far as the scrotum; at the end of a fortnight it burst, and discharged near twelve ounces of pus, of an urinous fetid smell; he was reduced by this attack to such a state of debility, as to faint on being taken out of bed. The bursting of the tumour left an opening, through which, every time he made water, some part of the urine escaped, with a violent smarting pain. As soon as his strength was sufficiently restored to bear the motion of a carriage, he came to London, which was in the beginning of May, 1796, and immediately applied to me.

As during the complaint, bougies had been passed more than twenty thousand times, he had long been of opinion, that no permanent relief was to be expected, but from the substance being destroyed, either by the knife or the caustic. At this time the general symptoms were, a continued gleet, pain in making water, and, for some time after, frequent and copious discharges of matter, chordee, and every sensation that attends a fresh-contracted virulent gonorrhoea.

Upon examining the urethra, by passing a bougie as large as the external orifice would admit, I found a stricture at five inches, and told the patient that the first thing to be done was to remove that obstruction; he told me that none of his former surgeons had found any stricture there, nor had they thought it necessary to attempt any thing at this part: that circumstance alone, I stated to him, was the cause of their failure; for he must recollect perfectly that after the caustic or bougie in

former trials had been used for any number of times, a contraction always came on at this part, and prevented him from persevering in their use ; and therefore although the stricture was slight, it was necessary it should be removed. He assented to the truth of my remark, and readily submitted to my conducting the cure in the way I thought best adapted for that purpose.

I applied the caustic to the stricture at five inches, which after four or five applications was removed. The bougie now passed down to the original stricture ; to this the caustic was used for several weeks, the pain in the application was severe, and he was obliged to pass a small bougie at the time of making water as before. The fistula became very troublesome. These symptoms however gradually abated, and the pain from the caustic, after some time, hardly deserved that name ; by the middle of July the use of the small bougie became unnecessary, and the call to make water was less frequent ; only three times in the night.

On the 25th the fistula was healed up, and the constant uneasiness in perinæo removed. The caustic was used in September every day for three weeks, and apparently with advantage, but the smallest bougie did not go into the bladder. Sept. 24th the fistula broke out, in consequence of the formation of a fresh abscess; on the 30th a silver sound passed into the bladder, and after it got beyond the part to which the caustic was applied, met no difficulty. The caustic when applied every day, gave more pain; so that after a few applications it was only used on the alternate days, and then again for a few times every day. October 17th the end of the bougie was more distinctly marked by the stricture. By Christmas the silver instrument was more readily got into the bladder; the irregularities behind the stricture preventing so weak an instrument as the bougie to pass over them. He now made water very well, and all his former symptoms were removed. He went into the country, and was to pass,

once every two or three days, the silver sound into the bladder, to keep the parts in their present state. I have heard of him six months since he left town, I understand that he continues free from complaint.

CASE IV.

A gentleman, thirty years of age, had a stricture, and in consequence of it, a fistula in perinæo, which made him miserable, and induced him to take the opinion of several surgeons separately, and afterwards in consultation, upon the means of healing up the fistulous orifice in the perinæum.

The means proposed were to lay open the parts to the bottom, remove the diseased urethra, and then heal up the wound. This operation was in itself so severe, that he preferred a trial of the use of the caustic to the stricture; for whatever had been his dread of a caustic, it was overcome by still greater horror for the knife. He there-

fore consulted me before he would submit to this operation.

I told him, after hearing all the particulars of his case, that there was no reason why he might not get well without any thing being done to the external parts, as all that was wanted for his recovery consisted in enlarging the natural canal, which, by removing the obstruction the urine met with in coming forward, would allow the parts behind to recover themselves, and in a very short time they might all heal up. That the caustic was certainly the most effectual means of removing the stricture, and therefore I did not scruple to recommend its use in this particular case. He wished a consultation respecting the danger. I told him I could have no objection to his having any other opinion, but was ready to take upon myself the responsibility respecting the effects of the caustic. His fears for the knife induced him to trust himself entirely to my care. Upon examination, he had two strictures, which were both

removed by eight applications of the caustic. He then felt himself much easier, made water less frequently, and a few drops only passed through the fistula, but still a bougie did not go into the bladder. This I conceived to arise from the irregularity in the urethra, where the orifices leading to the fistula had their origin, behind the stricture. I therefore passed a flexible gum catheter with a stilet, to throw the point forwards, and avoid these irregularities. This went with ease into the bladder. The fistula healed up, and in a few weeks the parts had so much recovered themselves, that the surface was smooth enough to allow a large bougie to pass into the bladder.

A year after the passage continued in the same state, although he was liable to occasional irritations in it, in consequence of the parts remaining weak: these always went off without any remedy being applied.

CASE V.

A gentleman, forty-six years of age, had a stricture, which was not known till it produced a swelling in perinæo, in Oct. 1793, at which time the use of the bougie was begun. The abscess afterwards burst, forming a fistula in perinæo. He was extremely irritable, and no progress could be made by that instrument, without every mode of palliating its effects being adopted, such as warm baths, opium, ether, and the caustic alkali taken internally, which soothed the irritation of the bladder. His skin was so irritable, that mercurial ointment inflamed it, if twice used to the same part. The lunar caustic was applied to the orifice of the fistula, and the effects were severe, beyond any thing usually met with.

By the bougie, the internal use of the caustic alkali, and great management, the passage was dilated, and the fistula healed up, or nearly so; but neither a bougie nor a

catheter could be passed into the bladder; after a few months, the perinæum swelled again, and opened anew. In this state, March 30, 1796, I saw him; I applied the caustic to a stricture at the distance of $5\frac{1}{2}$ inches, it gave no great pain, and brought on no irritation; the second time this stricture gave way; another stricture $1\frac{1}{4}$ further on, was touched twice, and the bougie went into the bladder. This gave more pain and lasted longer. On April 2d an armed bougie a size larger was applied, it halted at the first stricture, but went through and was applied to the second.

April 10th the bougie went into the bladder. April 15th a larger bougie passed through the first stricture with difficulty; it brought on irritation, and the fistula opened; this soon went off. Afterwards the caustic was applied to the last stricture, without irritation. May 10th a catheter went into the bladder (which it had never done before).

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The use of the caustic was continued till

the 20th of May, when a flexible catheter as large as a full sized bougie passed, but the bougie itself could not reach the bladder.

After this the parts were left to themselves, but the symptoms were not found to abate. In June a sound was passed to examine the bladder; no stone was found, but something hard in the perinæum. The flexible gum catheter of the largest size was passed every night at bed-time, and left in all night; it produced no irritation, nor did it give pain: in July the patient passed it himself, the hardness in the perinæum was almost wholly gone, and the urine did not come at all by the fistula, which was nearly healed; unless when he was very costive, or there was irritation in the bowels.

Finding some part of the hardness remain, which the use of the catheter had not subdued, in December the caustic was again used about twenty times, when this projecting part was much diminished, without producing irritation. The passage was now

freer at that part, the hardness much subdued, and the thickness in the scrotum entirely gone.

In May following the use of the caustic was again taken up, with a view of removing the hardness entirely; it was applied about twelve times, after which the parts appeared to be brought as much into a natural state as could be effected by the use of the caustic.

The canal admitted with ease any sized instrument, but there was a turn necessary to get past the irregularities where the orifice of the fistula had been formed in the urethra.

In this case the thickening and induration at the stricture next the bladder was so great, as to give the feel, in several examinations, of a hard substance; and led me to suspect that a stone was lodged there. This callous part was reduced by the application of caustic, in a greater degree than I could have imagined possible, without doing harm, in parts totally hid from the eye. This I

was enabled to attempt, from receiving so correct an impression of the parts on the end of the soft bougie, that I could ascertain the progress I made with the same accuracy as if they had been exposed to view.

CASE VI.

A gentleman, aged fifty-six, who had been repeatedly attacked by gonorrhoeas, in the month of July, 1788, being then in England, had a swelling between the fundament and scrotum, which after great inflammation and much pain, broke. As it communicated with the urethra, the urine passed through the opening; but after a voyage to the East Indies, the fistula healed in Feb. 1791.

In the month of August he first observed that there was a disorder in the urethra, and from the discharge of matter thought it was a gonorrhoea, and used medicines for the cure; but this process caused much uneasiness and pain; as the discharge continued,

it was supposed to be a gleet, and for a considerable time was treated as such. As he did not find any relief, but a difficulty and pain in passing the urine, with a frequent desire to discharge it, he at last concluded there was a stone in the bladder; he was, however, assured that he had not any positive symptom of that disorder. On the 19th of January, 1796, he sailed for England. On coming round the Cape of Good Hope, the weather being very cold, he found a slight suppression of urine every night after being in bed. This continued until his arrival in England, on the 3d of August, 1796, and was much the same until the end of September, when, having caught a cold from exposure to rain, a total suppression of urine came on in the night, and afterwards frequently returned. On the 15th of December, 1796, he applied to a medical gentleman near London, who gave him boluses composed of mercury and opium, till the 10th of February, 1797. Not perceiving any prospect of relief from

this medicine, he applied to a surgeon in London, informing him of the suppression of urine, and that he conceived it to be produced in consequence of strictures in the urethra. The surgeon desired the urine might be saved for his inspection; after seeing it, he told him it did not arise from a stricture in the urethra, but from a contracted bladder, which he said he would cure in about three weeks. He injected the bladder with warm water for four months; at this time, the patient finding the complaint much worse, and that his general health was declining very fast, this treatment was left off. The same surgeon now took it up as a stricture, and finding an obstruction, applied a bougie armed with caustic; it was kept at the stricture for six minutes; this, as might be expected, brought on violent inflammation. The patient, alarmed at this practice, did not persevere in it; the pain lasted ten days, and then went off.

In June, 1797, he put himself under my

care. On examining the canal, there was an obstruction at six inches; and from the impression it made on the end of the bougie, the orifice of the stricture was very small; but as the patient informed me it had at several times been considerably dilated by bougies, but always contracted again, I applied the caustic, which gave little or no pain, and was attended by no inflammation; after the second application, the aperture of the stricture was evidently enlarged; after the third application he had a paroxysm of fever, that is, he had a cold fit, a hot fit, followed by a moisture on the skin; some hours after this went off there was another more severe (the shivering fit was without the feel of coldness); a profuse sweat terminated the attack. I told him that it was probable this stricture was now destroyed, as these attacks very often occurred when that happened. This proved to be the case; for at the next trial the bougie went through the stricture to another three quarters of an inch further on.

It is a curious fact, that the severe application of the caustic for six minutes, before he came under my care, which gave so much pain, and produced so much inflammation, was unattended by any constitutional irritation; and an application, which produced neither the one nor the other, but which destroyed a stricture, should produce a paroxysm of fever.

Every application to this stricture was attended in the evening with a suppression, requiring the use of the catheter to remove it; ten or twelve applications however destroyed it; and the bougie went on into the bladder, although there had been a fistula in perinæo. He now lost the spasm and suppression, but the parts remained uneasy, and the caustic was applied several times before the bougie passed with facility, after which the uneasiness went off.

This gentleman had, for twelve years, a feverish attack at night, principally every fortnight, which entirely went off when the stricture was removed. After the re-

moval of the strictures in the urethra, a spasm came upon the bladder, in the middle of the night, attended with suppression, for several times, generally only every other night, and then went off.

SECTION V.

CASES OF STRICTURE WITH UNCOMMON IRRITATIONS, WHICH WENT OFF ON THE REMOVAL OF THE STRICTURE.

IN many cases of stricture irritation takes place in the urethra when the parts are thrown into strong action, as in the coitus. This produces pain, and brings on spasm. An effect not very dissimilar, is in some instances produced by passing a bougie over the parts immediately after a stricture has been removed, the tender surface is irritated, and the effects extend to the bladder; these however go off, and are not afterwards met with.

In the first case, the spasm is removed by the caustic, and in the other, it is an accidental violence which goes off of itself, as will appear from the following Cases.

There is in the minds of many surgeons,

and almost all patients, such a dread of inflammation on the bladder, that when any symptom of irritation attacks that viscus, all means of preventing or removing inflammation are immediately had recourse to, and the ready abatement of the symptoms under their treatment, although they would have subsided of themselves, is attributed to the means made use of, which encourages the practitioners to pursue the same plan in similar cases.

CASE I.

A gentleman, about thirty years of age, had a stricture which was not very troublesome, but which rendered the stream of urine small and interrupted, it required the finger to be applied to the perinæum to throw out the last drops; after two applications of the caustic the unarmed bougie passed on to the bladder; after this was withdrawn, as the patient was anxious not

to lose any time, a larger armed bougie was applied to the stricture to enlarge the passage.

After this, he neither remained quiet nor made water, which always relieves the bladder, but walked about for several hours. This imprudent conduct brought on pain, local and general irritation, which lasted three days; the pain in making water then became less severe, a discharge came on, and the symptoms gradually abated; in eleven days the discharge was almost the only symptom that remained; this was removed by balsam copaiva. A bougie was now passed into the bladder to ascertain the size of the canal, which was considered of a sufficient size, and therefore nothing more was done. The passing of the bougie however brought on a discharge again, which lasted for ten days, and went off. A year after, I had an opportunity of passing the same bougie into the bladder.

CASE II.

A gentleman, thirty-six years of age, who had been many years in India, and had for a great part of that time been affected by the symptoms of stricture; in the year 1796 put himself under my care, and had the caustic applied. After it had been used several times to a stricture $6\frac{1}{4}$ inches from the orifice, the end of the bougie went through the stricture, the parts bled freely, and the pain was very severe; at the next application the bleeding returned again, and some hours after he had a spasm come on after making water, and nearly fainted. He passed the night tolerably well, but next morning, in making water while upon the close-stool, the pain was so severe that in two minutes he fainted away; he was much relieved by a glyster of warm water, and had no return of the fainting. The caustic was applied several times more to this stricture, and almost always attended by hæmorrhage,

and more or less of the feel of faintness and languor. He had been subject to complaints in his stomach for many years, and this violent effect probably arose from sympathy with the stomach, which in him was uncommonly irritable.

When this stricture was destroyed, three-quarters of an inch further on there was another, but the caustic when applied to it did not give the same pain, and the sensation was confined to the part. The caustic was used sixteen times to this last stricture before it was destroyed, and the last three times the caustic was made as large as the bougie would admit of, after which a full sized bougie passed freely into the bladder.

CASE III.

A gentleman, about thirty years of age, had an irritation in the urethra at the time of having connection with women, and at that time the semen was not propelled for-

wards; this gave him a great deal of uneasiness, and induced him to apply to me for assistance. I told him that there was no cause I knew of which could produce such an effect, but a stricture; and on examining the urethra, one was found about $5\frac{1}{2}$ inches; this was removed by two applications of the caustic: another at $6\frac{1}{2}$ required seven or eight applications; and the last two or three times the caustic was used there was a good deal of bleeding.

The symptoms went away as soon as the stricture was removed. The gentleman went to sea, and remained on board of ship for three or four months; after which he returned to town, when I had an opportunity of examining the canal, and found it in exactly the same state, the stricture having in no degree returned.

CASE IV.,

A gentleman, aged thirty, about seven years since had a venereal gonorrhoea; he

immediately used an injection, and in about a week (as he had no disagreeable sensations, and no discharge) he concluded himself well, and therefore left off the injection; in about three days, however, the running returned with considerable violence: he then applied to a physician, who ordered him to drink whey in great quantities, and to take gum arabic and nitre. The scalding and running rather increased under this treatment; he therefore, in about six weeks, applied to a surgeon, who began by giving mercurial pills and gentle purges; but not finding these to answer, gave balsam copaiva, elixir of vitriol, and an injection.

At the end of a month, he found a difficulty in making water, upon which the surgeon passed a bougie of about 4 inches in length, which met with some obstruction; he advised him to continue the bougie in the urethra the whole of that day, and repeat it for about four or five hours the next day; and in about three or four days he

directed him to wear the bougie the whole day. After wearing it for a month, the surgeon said the stricture must certainly be removed, and the bougie was left off. Bathing was afterwards directed for the cure of the discharge, which still continued as bad in colour, and as much in quantity, as ever.

In a week the running and scalding became so disagreeable, that he determined to apply to another surgeon: this gentleman advised taking larger doses of copaiva and elixir of vitriol than before, but this was of no service; he afterwards took hemlock pills, but with no effect. He attempted sea-bathing, but this disagreeing with him he left it of. The running and scalding, after he had been some little time at the sea, seemed rather to abate. He had during this period frequent connection with women. After he had been at the sea about six months, he felt more disagreeable sensations in the urethra than usual, and the running so much increased that he con-

cluded himself again infected, and made use of an injection of sugar of lead and rose-water; this was of so little service that he determined to go to London. He was then put under a course of bougies; he began by using one five minutes at a time, and increased it. After wearing the bougie twice, one of the testicles gave pain in the morning, and before night it swelled considerably; the swelling and pain did not leave him for more than a month. He made water freely during that month; but after the swelling had almost subsided, and he was sufficiently well to go out, he found at times a good deal of difficulty in making water. He passed a bougie when this happened, and then the urine came forward very well; the bougie was at some times a good deal more obstructed than at others. Once he was a great deal alarmed at not being able to pass it at all. He was ordered to go to bed, and to take a decoction of marsh-mallows; he made water tolerably well before morning. It was now supposed that

the complaint in his urethra proceeded from spasm. A bougie was passed repeatedly to ascertain this point, of which he at length thought there was no doubt. It was now wished to have Mr. Hunter's opinion. Mr. Hunter passed a bougie, and after it was withdrawn, said that there were three strictures in the urethra, but from the account concluded they were spasmodic. Mr. Hunter recommended, therefore, that he should always be provided with bougies, for the purpose of passing them when he had any difficulty in making water; he also advised the patient to take the extract of hemlock. The running still continued the same in quantity and colour: he took the hemlock, and entirely left off wine. Scarce a day passed without his being obliged to make use of the bougie, to enable him to make water. He perceived at times, that different parts of the urethra obstructed the bougie; at others, a moderate sized bougie went into the bladder with scarce any obstruction. While he remained in

London he had frequent nocturnal emissions, which commonly awoke him; the semen was always discharged.

After he had been some time in the country, he was much alarmed by having been awakened by such an irritation, without any emission. He had connection with a woman, and took means to ascertain exactly whether this would constantly be the case, and found that the same thing happened five or six times afterwards. The seventh time he had connection with a woman, in the same manner, the semen came forward, but in very small quantity. He now made use of exercise on horseback (which he had before left off); but did not find any alteration. The symptoms at this time were exactly these: a discharge from the urethra, similar to that from a gonorrhoea, attended with some drops of blood, which generally followed the urine; a small degree of uneasiness in one of the testicles; the semen seldom coming forward in the action of the coitus, and then

in small quantities ; a necessity of making use of the bougie, to relieve a suppression of urine, sometimes once, sometimes oftener, in the course of the twenty-four hours. Notwithstanding these circumstances, he continued in his general health as well as he had been before he had the complaint. In about eight months he returned to the use of wine, which made no alteration whatever in the complaint for the worse ; it continued without any variation till about the 7th of October, 1795. He had been in the country shooting the whole of September, and felt one morning when he was out a constant desire to make water, with a good deal of uneasiness in the bladder, which obliged him to return home and go to bed ; he took an opiate draught, and had bladders of warm water applied to the perinæum.

He felt a good deal of pain in the bladder after making water, and also in the back and kidneys ; the whole of this time, the water came in a full stream. He continued

in a good deal of pain for about ten days, after which it abated.

A surgeon passed a bougie, and told him that he had one permanent stricture in the urethra, which was the cause of his complaints ; he advised, as his testicle had been swelled before, that he should use the warm bath at the same time with the bougies ; that he should pass the bougie, not into the bladder, but a little beyond the stricture : the pain in the bladder and kidneys gradually subsided.

He then required the occasional use of the bougie (which he had not done while the pain continued) in order to make water. He now took exercise as usual, determining to put off the passing a bougie for the present. He did not commence wearing the bougie till May, and did not go into the warm bath. He increased the time of wearing it to about two hours in the morning, and the same at night. He continued this plan till January ; the semen now almost always came forwards, but not in the

usual quantity. He had connection with a woman, and in about four days had a discharge attended with a good deal of irritation in the bladder.

Under these circumstances he put himself under my care. Upon examining the urethra, a stricture was found, at about five inches.

The caustic was applied while there was a very great discharge, much irritation and tenderness. The pain of the caustic did not increase the irritation, or bring on affection of the testes, or any other unpleasant symptom. The discharge diminished considerably, even under the use of the caustic. After applying the caustic twice to the first stricture, and five times to one at six inches, the bougie went into the bladder, and afterwards a bougie the full size of the canal passed without difficulty, but gave a great deal of pain, and brought on a paroxysm of fever, which went off; next day the discharge increased; but disappeared in a few days.

The semen now came forward in the full quantity, and all the former irritations subsided; nor did they return in the course of the time when I had an opportunity of seeing him, which was for several months after his recovery.

SECTION VI.

CASES OF STRICTURE ATTENDED WITH UNCOMMON CONSTITUTIONAL AFFECTIONS, WHICH DISAPPEARED ON THE REMOVAL OF THE STRICTURE.

STRICTURES in many patients affect the stomach, and through the medium of the stomach the whole system, so as to derange the general health ; this cannot be known in any other way, than by the health being recovered when the stricture is removed.

In other instances strictures bring on both constitutional and local complaints, which are not suspected to be in any way connected with them.

The inference which it is natural to draw from these observations is, that wherever there is a stricture in the urethra, and other complaints which are of an ambiguous nature, it is a necessary step towards the in-

vestigation of these complaints, first to remove the stricture, so as to ascertain in what degree it is connected with them.

CASE I.

Stricture attended with Complaints in the Stomach and Eruptions on the Skin.

A gentleman, thirty years of age, had an eruption on his skin, attended with discoloration of the cuticle, that spread over different parts of his body, particularly his breast and arms. He had a complaint in his stomach which distressed him exceedingly, frequently producing sickness and great uneasiness. Added to these distresses, he had a gleet and frequency in making water.

Every medical assistance had been given for the complaints in the stomach and skin, without much benefit, and it was for these only that I was consulted. Upon a more accurate investigation it proved that he

had a stricture ; and from the intimate connection between that complaint and the stomach, I thought it probable that the stricture kept up such a degree of irritation in the general system, as to prevent the other symptoms from being removed. Upon this ground I proposed first removing the stricture ; this was done by five or six applications of the caustic, and afterwards the stomach was found to be less irritable, and small doses of corrosive sublimate now removed the complaint in the skin, which had before resisted the effects of mercury in that form, as well as in several others.

The stricture has not returned, nor any of the other symptoms, although it is now more than a year and half since it was removed.

CASE. II.

Stricture with Irritable Stomach.

A gentleman, aged forty-six, had a stricture for twenty years, brought on while in India. For the last twelve years of that period, he was made very miserable by an irritable state of the stomach, which was sometimes more violent than at others. He had occasionally suppressions of urine, but almost always upon going to bed, as soon as laid down, he had a pain and heat in the stomach, with restlessness, a dry tongue, quick pulse, and general uneasiness; these symptoms continued till three or four o'clock in the morning, when they began to abate. His stricture admitted a small bougie, and could be dilated by that instrument to a certain degree; but any attempt to exceed these limits brought on irritation, and the canal at that part contracted as much as before the bougie had been used. Under these circumstances he

was told by the most eminent surgeons he consulted, that the complaint could not be remedied ; he must therefore bear with it, and palliate the more severe symptoms when they occurred,

In October, 1796, he put himself under my care. On examining the urethra, I found a stricture about $4\frac{1}{2}$ inches from the external orifice, which was removed by three applications of the caustic ; when the bougie went through it brought on a severe paroxysm of fever, with an extremely profuse perspiration. Another stricture was met with at $5\frac{1}{2}$; this required six applications, which gave a good deal of pain, but produced no irritation in the stomach ; when the stricture was destroyed another very severe paroxysm of fever came on, and was succeeded by a second equally violent. The caustic was now applied to a third stricture at $6\frac{1}{2}$; it was repeated twenty-two times before the bougie went through ; this was followed in a few hours by an attack of irritation in the bladder, and a

strangury that lasted four hours; these went off, and a violent paroxysm of fever, which was followed by a second, terminated the effects of the irritation. The complaints in the stomach now went off. The caustic was not applied for fourteen days; but it was found necessary to use it four times more before the bougie passed with ease to the bladder. He passed the common bougie for two months, a few minutes every day, to give him every security against a return.

The curious circumstance in this case was, that in ten days after the last stricture was destroyed, he was able on going to bed to go to sleep (the usual irritation having been removed) which he had not been able to do for twelve years.

A year after his recovery there has been no return of the stricture.

CASE III.

Stricture with Fever and Delirium.

A gentleman, sixty years of age, in the year 1761 had an attack of strangury; as this was the consequence of gonorrhœa he had mercurial injections given him, and went into the country. From that time he never made water freely, and finding himself get worse and worse, in 1773 he came to London, when it was ascertained that there was a stricture, but a bougie could not be passed. He was obliged to return into the country in a state of almost constant distress, his urine passing involuntarily, attended with violent attacks of irritation. In June, 1785, he had a rigor, and very severe attack of fever, excruciating pain in making water, and discharge of mucus and blood from the bladder; this attack lasted a fortnight, after which he found himself easier, his urine did not pass involuntarily, nor had he so much pain;

but he soon relapsed into a worse state than before. After dragging on a miserable existence for ten years, by the advice of Dr. Darwin he resolved to try the caustic, and came to London in the beginning of May, 1796. At the time of his arrival he made water with excruciating torture, the straining brought on the piles in a great degree, and considerable inflammation in perinæo; his water came away mostly involuntarily, he had frequent attacks of delirium, little or no appetite, with nausea and vomiting. In this state the caustic was passed, it gave no pain, but was followed by a rigor, and the other complaints were aggravated, which made it necessary to wait for a week; and from the general distress under which he laboured I was led to suspect stone in the bladder, particularly as there was a great deal of mucus at intervals thrown off from the bladder. The caustic was again applied, it gave less pain, and was followed by less irritation; there were two strictures. The caustic was ap-

plied in all twelve times, and a tolerably large bougie passed into the bladder; all the symptoms now subsided, he made water in a full stream, and only once or twice in the night; the tenesmus went away, and the bladder appeared to have perfectly recovered itself. He still continues free from his former complaints.

CASE IV.

Stricture with Nervous Fever.

A gentleman applied to me for assistance, in Feb. 1796; his complaints were nervous affections, restlessness, quick small pulse, uneasy and disturbed sleep, with heat in the skin, symptoms which were considered to constitute nervous fever. He had at times uneasiness in the bottom of the belly, and straining to make water, and his urine was loaded with mucus, which also came off after the urine had ceased to flow. He made water commonly once in the

course of the night, but had no apparent difficulty in voiding it, nor did he believe that the stream was smaller than is natural. He had been ill for several years in India with the same feverish indisposition, attended with affections of the bladder, and a discharge of mucus after making water; but these local symptoms had always been referred to the constitutional complaints, and when he came to England, not suspecting any local disease, he put himself under the care of a physician, who declared that all the symptoms were effects of the fever, and treated them as such. They did not yield to the prescribed medicines; and upon stating his complaints to some of his friends, they told him that they had similar affections arising from stricture in the urethra, and thought it probable that his symptoms might arise from the same cause. Upon this idea he was led to consult me.

He had never passed a bougie; I therefore begged to ascertain by that instrument the state of the urethra. In doing so I met

with an obstruction about $5\frac{1}{2}$ inches from the external orifice, I therefore concluded there was another nearer the bladder. The caustic was applied to this stricture, it gave pain, but brought on no irritation: this was repeated, and the bougie went through the stricture, but did not go on above an inch further, having met with another obstruction; this allowed a small bougie to go through it, which led me to conceive that its destruction would be attended with little difficulty; and I thought his never having used a bougie was a probable cause for the stricture being in a more natural state, therefore more readily to be acted on by the caustic. In all these opinions I found myself much mistaken, for it required six applications; after three of them there was a good deal of blood and faintness, but this went off; and he told me after the sixth application that he felt himself uncommonly well, his general irritation had left him, his spirits were good, and he was more himself than he had been for a considerable

time. After receiving this account I passed the bougie to ascertain our progress, and it went into the bladder, but it required above six more applications before a common sized bougie could be admitted to pass; it was about the 20th of March, 1796, when it was left off. In June I passed the same sized bougie with ease, and I believe he has had no return of his stricture. His feverish symptoms left him along with those of the stricture, they therefore probably arose from the same cause.

CHAPTER V.

CASES OF STRICTURE CONNECTED WITH
OTHER DISEASES.

WHERE two diseases are present in the same patient, in parts connected with each other, and employed in performing the same functions, it is difficult to ascertain what are the appropriate symptoms of either of them. These can be only determined by removing one of the diseases, and attending to the symptoms that still continue, which must belong to the remaining disease.

From the instances contained in this Chapter, it will appear that strictures are sometimes secondary complaints, and little alleviation of the patient's sufferings is gained by their removal; there is, however, in such cases no mode of ascertaining the original disease while the stricture exists; so that even here it is of the utmost conse-

quence to destroy the stricture, as it enables the surgeon to come at a knowledge of the state of the prostate gland and bladder, and to take the necessary steps for relieving them when diseased.

The influence of gout upon stricture, and of stricture upon hydrocele, are curious circumstances, and their being made known may materially assist in the treatment of these diseases when they occur in the same person.

SECTION I.

CASES OF STRICTURE ACCOMPANIED BY DISEASE OF THE PROSTATE GLAND.

HAVING met with so few cases of stricture in which the prostate gland was enlarged, I have given these Cases by themselves, as the strongest proof I could offer of the disease of that gland being less common than is generally imagined.

Cases of diseased prostate gland at a certain age, independent of stricture, are by no means uncommon, and I have met with them very frequently ; but these are not to the present purpose.

It will appear from the detail of these Cases that there is a ready mode of distinguishing the two diseases from each other, and little observation is necessary for that purpose.

CASE I.

A gentleman, aged fifty-one, in May, 1779, was exposed to the heat in India, during the time of the year when the hot winds prevail most, in a situation where they are remarkably violent, and when from particular circumstances he felt much anxiety of mind. This brought on a severe fit of suppression of urine, for which the usual applications were made; these relieved him so much as to enable him to pass his urine drop by drop, there was much spasm at the neck of the bladder, which continued with very little abatement for about two years; the complaint then seemed to abate gradually, but during the whole continuance of the symptoms he found most relief in cold weather. From the year 1781 the symptoms became more favourable, and he was able to make water in a small stream till 1785, when he left India. On his passage home they gradually diminished, and as soon as

he came into cold latitudes he seemed to be perfectly well. He cannot ascribe these complaints to any venereal disorder; but within the three years finding a return of the irritation (though very different from what he had formerly) with a difficulty in making water, he conceived there might be a stricture in the urethra; as ever since his return to Europe, he has been at times liable to slight returns of the strangury, which opiates relieved, and he finds himself better in winter than in summer.

In 1796 he put himself under my care; and upon examining the urethra, there was a stricture at six inches.

The caustic was applied to this, and three applications destroyed it; there was another at seven inches, which gave way after four applications; the bougie now passed through it, but did not go into the bladder; an attempt was made with the catheter, but it would not pass, although he made water very well, and experienced much relief from the strictures being destroyed.

The prostate gland in this case is enlarged, and prevents, by its size or irregular form, the catheter from going into the bladder.

This is the only case, either of stricture or enlarged prostate gland, in which I have known the symptoms aggravated by warm weather, and relieved by cold; it is in general the reverse.

CASE II.

A gentleman, forty-six years of age, had all the common symptoms of stricture which I have so frequently described; for these he consulted me.

Upon examining the urethra two strictures were met with, and were both removed by the use of the caustic; the bougie passed readily through the strictures, but stopped at the prostate gland, and could not go on to the bladder. I tried a flexible gum catheter with a stilet a good deal

curved, which readily passed. I then tried the bougie again, bent at the end, and with a slight stoppage at the prostate gland, it passed over it. I explained these circumstances to the patient, and advised sea-bathing and quietness, to see how far the removal of the stricture would in time dispose the gland to subside. He went to the sea, and returned to me six months after. The symptoms of irritation were much diminished, and the bougie now without any halt passed into the bladder; so that the diseased enlargement of the prostate gland had evidently become smaller since the stricture was removed.

CASE III.

A gentleman, sixty-eight years of age, had been troubled for a year and half with a frequency of making water, a discharge of mucus from the bladder, and pain and irritation in the region of that viscus. After

having tried the effects of internal medicines without relief, he consulted me upon the subject of his complaints.

Upon examining the urethra there was a stricture about six inches, which was removed by the caustic after five applications, and the bougie when much bent went into the bladder; but his complaints were not at all relieved, so that the stricture was only a secondary complaint.

He caught cold some weeks after the stricture was removed, the weather at the time being uncommonly severe, and a stranguery came on, which required the use of the catheter, nor could it pass unless the instrument was very much curved, in any other form it stopped at the prostate gland; this swelling of that gland did not subside entirely for several months, although it diminished sufficiently to allow of his passing his urine with some degree of difficulty. The original disease was evidently an enlargement of the prostate gland, which had

been increased by accidental cold, so as to bring on these alarming symptoms.

CASE IV.

Spasmodic Affections of the Urethra in consequence of diseased Enlargement of the Prostate Gland.

A gentleman, sixty-four years of age, consulted me on account of a stricture which he had laboured under for fifteen years. The symptoms he said were an occasional leakage of the bladder, by which he meant an involuntary passing of the urine; an inability to pass a bougie into the bladder, unless it was curved and was composed of materials which preserved that curve; that the part it stopped at was about eight inches, and the attempts to get beyond the obstruction brought on hæmorrhage; that if a plaster bougie (one made of linen), was passed, it brought on great irritation, and was with difficulty withdrawn;

but an elastic gum bougie came out with tolerable ease. In the morning he was unable to pass a bougie more than a few inches into the urethra, but in the evening it went on to the bladder; and for the last fifteen years he had occasionally passed one of elastic gum, curved for that purpose, which being used two or three times, relieved the involuntary flowing of the urine.

From this account, considering his age, that the symptoms had been only occasional, that there had been no great increase, that a curved bougie passed better than a straight one, that there was only an involuntary discharge of urine and no suppression, I ventured to assert that he had no stricture whatever; but begged he would allow me to examine the canal, that I might ascertain the real state of it. To this he objected; he said I should fail, bring on irritation, and for several days he should be unable to pass his bougie: without such an examination I declared myself unable to

give any opinion, and if he was desirous of having it, he must submit to such temporary irritation, to which with some difficulty he assented. As I did not believe the disease to be stricture, I did not offer to pass a bougie, but a full sized flexible gum catheter with a curved stilet, which without pain or difficulty of any kind, although four times larger than the bougie he used, passed into the bladder, and drew off the urine, and while it was withdrawing was not grasped by the urethra. The disease was therefore an enlargement of the point of the prostate gland, which this instrument, from its shape, readily passed over, and therefore produced no irritation; but the bougies formerly used, by irritating the urethra close to this gland, brought on a contraction along the whole canal.

I stated to the patient that when he caught cold the gland enlarged, and in that state he had an involuntary passing of the urine; when that happened in future, all that was necessary to be done was occasionally pass-

ing the catheter till that subsided; that the use of the bougie only kept the parts in a state of irritation, and should therefore be left off.

SECTION II.

CASES OF STRICTURE ACCOMPANIED BY DISEASE OF THE BLADDER.

CASES of irritable bladder too frequently occur with stricture, at least I have met with many instances of it. The following Cases will be sufficient to shew the symptoms which the disease in the bladder produces, for the stricture does not appear to aggravate them, in the degree it would be natural to expect.

It is difficult, and perhaps impossible, to tell which is the original disease. I am inclined to suspect the stricture is in most cases the cause of the disease in the bladder, and that when the bladder has become diseased, it is in some instances so violently affected, as to be unable to recover itself even after the cause is removed. It is natural however to believe, that if the stricture is

allowed to increase, or even to remain, it must render the irritation in the bladder more violent, and its consequences of a more serious nature.

CASE I.

A gentleman, thirty years of age, of a very irritable body and mind, had a discharge, frequency in making water, pain in the region of the bladder, and a considerable quantity of viscid matter deposited from his urine.

A stricture was supposed to be the cause of these symptoms; he therefore applied to me to have it removed. A stricture was discovered at $5\frac{1}{2}$ inches, which was destroyed by the caustic, and another at six inches, after which the bougie went readily into the bladder. The symptoms, particularly the frequency in making water, and the quantity of viscid matter thrown out with the urine, were by no means diminished.

Stone was now suspected, and I sounded the bladder; but none was felt; as the end of the sound passed over the inner surface of the bladder, it came against the rugæ of the inner membrane of that viscus, and when these were touched the patient expressed much pain. This disease of the bladder appeared sufficient to account for the symptoms.

A year after the stricture was removed, the bougie was passed to ascertain whether there was a return; but it passed with the same ease as before. No medicines that had been tried, the principal of which were the uva ursæ, and the mephitic alkaline water, had removed the symptoms of irritation in the bladder; they were however much relieved.

CASE II.

A gentleman, aged thirty, had a frequency in making water, particularly in the forenoon, which continued through the

of the bladder arose in part from a stricture, as the bougie at $5\frac{1}{2}$ inches met with an obstruction. I therefore proposed that the stricture should be removed, to ascertain how far that was the cause of the complaints. For this purpose the caustic was employed. One stricture was destroyed after four applications, but another was met with an inch and half further on; this required twelve applications of the caustic before the bougie went into the bladder. When this was accomplished the use of the caustic was left off.

He felt himself better, the frequency of making water was less, his general health was improved, but still he was by no means well; the urine deposited the same sediment, although in less quantity, and he made water oftener than persons in health. In a few weeks his complaints got worse, and he consulted me again upon a supposition that the stricture had returned. The bougie was found to pass with great ease. I therefore proposed to sound the bladder;

the sound passed readily, and nothing hard could be felt. The complaints were therefore the effects of an irritable bladder, probably brought on by the stricture, which had not subsided although the cause had been removed. This is not unfrequently the case, and the bladder requires some months to recover itself.

In this case the irritation in the bladder is the same in the night as in the day, or nearly so.

CASE IV.

A gentleman, aged sixty-five, had used bougies on account of a stricture for many years, but for the last year the symptoms were much increased, attended with great irritation in the bladder, making water fifty times in the twenty-four hours. Finding no relief under one of the most eminent physicians and surgeons in London, he resolved, although extremely irritable, to try the caustic. It was applied to two stric-

tures seven times before it admitted a large bougie to pass into the bladder; and after it had done so the symptoms were little if at all relieved. This led to a suspicion of the prostate gland; but as the bougie passed with tolerable ease into the bladder, it gave reason to believe that gland was not much enlarged. I begged, however, to pass a catheter into the bladder, and found that the catheter drew off three times the quantity he usually made; and he was able to keep in the catheter three hours without making water, although he never could retain a bougie half an hour. I therefore concluded the disease for the last year was principally in the gland. This plan was now adopted. The water was drawn off once in twenty-four hours. In a very few days the quantity of mucus in the urine was diminished, and he passed it less frequently, there was less straining to go to stool, and he felt himself every way better. He attempted passing the catheter successively, to prevent the bladder from acting, but the intervals rather diminished,

the first time $1\frac{3}{4}$ hours, second $1\frac{1}{4}$, so that the irritation appeared to be in the coats of the bladder; the uva ursæ in powder was administered, but did nothing. The caustic alkali was afterwards given, but its use was interrupted by the bowels being affected. He found, however, that drawing off his water three times a day diminished the irritation, which therefore he continued to do. Oct. 17th, he found himself in every respect better by using the catheter three times a day, there was less mucus from the bladder, and that less tenacious.

In March, 1797, he had periodical returns of discharge and irritation in the bladder, and was nearly, in respect to uneasiness, in the state I first saw him, the disease producing the irritation being evidently in the bladder. He had however this advantage, that he could now always empty it by passing the catheter, and in that way could draw off the mucus as fast as it was formed, which in a degree relieved the bladder, and prevented more serious attacks from the disease.

This case is a complicated one; the patient had stricture, enlarged prostate gland, and irritable bladder; but as the symptoms from the state of the bladder were most severe, I have given it a place in the present Section.

SECTION III.

CASES OF STRICTURE ACCOMPANIED BY CALCULOUS CONCRETIONS IN THE URETHRA AND BLADDER.

CALCULOUS concretions are more frequently met with in the bladder and urethra of patients who have stricture than is generally believed. It will appear from the following Cases, that in many instances the presence of the stone can in no other way be ascertained than by the use of the caustic; since, in some of them the stone had been formed for years, and although every other mode of investigation had been adopted, this was not discovered, till by the use of the caustic the nature of the case was explained. It is curious that in M. Daran's work* only

* *Observ. Chirurg. sur les Maladies de l'Urèthre, traitées suivant une nouvelle methode. Par Jacques Daran. Nouvelle edition. Paris, 1748.*

three cases are mentioned in which calculous concretions were discovered. In two, the stone was in the perinæum ; in one, it was in the bladder.

Calculous concretions when in the urethra keep up a continual irritation, which can only be relieved by their being voided, or removed by an operation.

A stone in the bladder not only causes an irritation in that viscus, but also produces a contraction in the urethra, forming stricture. As these are two symptoms of the same disease in different parts, it is natural to suppose that the removal of the stricture would diminish the uneasiness in the bladder ; but the fact is otherwise, it often increases it ; this I suppose to take place by the bladder being enabled to empty itself more completely, which contracts upon the hard stone. This is an effect that could not have been expected *a priori* ; I therefore feel it right to mention it particularly, that this circumstance, when it occurs, may not mislead the surgeon, or be considered

by the patient as the consequence of any irritating effect of the caustic.

CASE I.

Stricture and Stone in the Urethra.

A gentleman, twenty-four years of age, consulted me for a complaint in his bladder, of which he gave the following account. When he was seven or eight years of age, he had at times pain in the region of the bladder, and his urine was very high coloured; to these symptoms he paid little attention, but recollects that they were sometimes so severe as to make him stop in the middle of his walks, and sit down for some minutes, till their severity abated: under these circumstances, when ten years old, he passed two triangular stones, each side of the triangle exceeding one-eighth of an inch in length; these gave a great deal of pain in coming through the urethra; but after their expulsion the former symp-

toms entirely disappeared, and he continued free from complaint for three years. The same symptoms however recurred at thirteen years of age, and have continued ever since. The attack came on most commonly after emptying the bladder; it began by heat in the urethra, extending to the glans penis; and when it reached that part it was most severe, and gradually subsided. These attacks lasted sometimes four hours, at others a much shorter time; they brought on sickness at the stomach, and general uneasiness over the whole body; they were less frequent in cold weather, the longest intervals were five months; but in summer they often returned in a fortnight. For the last three years they have been more frequent, the intervals rarely exceeding ten or twelve days; and for three months past, the attacks have come on with more or less violence every day, which induced him in July, 1795, to apply for relief. At this time his urine passed in a small stream, and never in any very considerable

quantity, which led me to suspect a stricture; and upon examining with a bougie, a stricture was met with. This, however, allowed a small sized bougie to go into the bladder; I could not therefore suppose all the symptoms derived from that cause, and suspected that there must be a stone in the bladder. To determine that point, a small bougie was passed, and after lying some time in the urethra, a very small silver sound was admitted with difficulty into the bladder, but no stone was found. This induced me to believe there might be a calculus behind the stricture, too small to obstruct the passage, but too large to pass the stricture; and that this, whenever it was thrown into a particular situation, brought on those fits of irritation, which could not be attributed to the stricture alone.

From this view of the case, it was proposed to destroy the stricture by the caustic; for which purpose it was applied five times, and a full sized bougie passed through; but during this period, which was

ten days, there had not been the smallest abatement of the symptoms.

This discouraged the patient ; but it was found, when this stricture was destroyed, that there was another a little further back towards the bladder, which sufficiently accounted for the continuance of the symptoms. The caustic was now applied to the second stricture ; this was done eight times before the stricture would admit a tolerably large bougie ; and in passing it the last time the caustic struck upon something hard, so as to be felt by the patient, and very distinctly communicated to the hand that was passing it. There was now no doubt of the presence of a small stone behind the stricture, and I persevered with the caustic, to give as much room as possible for voiding the stone. The patient had now for the first time a remission of the symptoms for a week ; the caustic was applied twice more, and a full sized bougie went on to the bladder ; the patient voided considerable quantities of coarse crystallized sand,

which he had not done before, and felt the small calculus giving pain, by moving in the passage from irregularities on its surface; this went off, it was therefore supposed the calculus was voided in making water without his knowledge. The large bougie was passed for a few minutes every day, to keep the urethra from being again contracted; and in this state he went into the country.

The symptoms were entirely removed, and there has been no return since that time, now above two years.

CASE II.

Stricture and Stone in the Urethra.

A gentleman, sixty-three years of age, had been ten years subject to the symptoms of stricture, and obliged occasionally to have recourse to the use of the bougie. For the two last years he could not make water at all, without first passing a small bougie

through the stricture, and leaving it in during the whole time of voiding it. In the North of England where he resided his complaint was supposed to be a diseased prostate gland.

In this state he came to London in June, 1796, and put himself under my care. Upon examination his case proved to be stricture. The caustic was applied three times to a stricture $5\frac{1}{2}$ inches from the orifice of the urethra, which it destroyed; it was then applied to a second at $6\frac{1}{2}$ inches; after the third application the unarmed bougie went through it, and the end of the bougie had a depression upon one side, evidently made by a rounded body; on feeling the parts externally, there was a small hard substance distinctly felt in that part of the canal.

I told the patient I could now explain the cause of his not making water without the bougie being kept in the urethra, as also the sensation he had often expressed of something falling into the stricture; for

there was a small calculus imbedded in the urethra behind the stricture, which was forced, by the action of the bladder on the urine, against the orifice, so as to stop it up altogether. I now increased the size of the caustic, and did not attempt to pass this part, lest I might force back the stone into the bladder.

After about seven applications of this large armed bougie, the end of the caustic went through and passed over the stone, which made an impression upon the side of the bougie; this shewed there was no part of the stricture on that side of the urethra left, but that the caustic came directly on the stone.

I proposed at our next interview to pass an instrument beyond the calculus, and disengage it from the hollow which it had made for itself behind the stricture: but that very night he voided it naturally, and also a smaller one which lay behind it, and found himself immediately after able to make water perfectly well.

The largest stone in its shape was pointed at one end, and obtuse at the other, five-eighths of an inch in length, and the thickest part three-eighths of an inch broad ; its figure was that of a flattened cone. It lay in the urethra with the apex directed to the external orifice.

The other was smaller and roundish, two-eighths of an inch in one direction, and one-eighth and a half in the other. They were dark coloured, and very compact in their texture.

I have heard frequently of the patient since that time, and he continues perfectly well.

CASE III.

Stricture and Stone in the Urethra.

A gentleman, fifty-eight years of age, in the year 1760, lived in the East Indies, and had a diminution of the stream of urine, requiring an unusual length of time

to empty the bladder; he remained in India till 1771, and in the course of the last ten years had four or five times a total suppression; this was not brought on by irregular living, for he was always moderate respecting wine, and the climate made catching cold a very improbable circumstance. It happened in consequence of retaining his water, from being in company with ladies, beyond the usual time; the symptoms were very severe, they were relieved by the warm bath, bleedings even to fainting, and the use of the silver catheter (bougies at that time not being in use in India); during this period the stream at all times was as small as a thread.

In 1771 he came to England, and put himself under the care of Daran's agent in London for selling his bougies, and in the course of five months, constantly persevering in their use, and retaining them four hours at a time in the passage, it was dilated so as to admit a bougie the size of the common flexible gum catheter. He found

himself free from complaint, and retained his water the usual time of persons in health. In this state he left them off; but he found in a few months that his complaint had begun to return, and was obliged to recur to the bougie, and by means of its use kept himself very well till 1785; but during these fourteen years he was obliged four or five different times to put himself under the care of the same person, to restore the parts from the contracted state they had acquired; and after each course of bougies the intervals became shorter and shorter.

In 1785 the bougie began to fail him; he could not now retain it in the passage above an hour, sometimes not half an hour, nor could he increase its size as he had done before. Under these circumstances he consulted a surgeon of eminence, who was induced to believe there was some complaint in the bladder, and with a view to ascertain this, passed a small silver sound into the bladder; this proved to be a very severe operation, and from the difficulty

attending it, the surgeon was unable to make a satisfactory examination, and proposed that it should be repeated; this however the patient could not submit to, as he conceived the presence of a stone in the bladder would be followed by symptoms which would sufficiently explain themselves.

Discouraged by this practice, he returned into the country, giving up all hopes from medical assistance. He made water every hour, could pass a very small bougie into the bladder, and when he wanted to make water, a bougie introduced a little way assisted it in flowing. He made water as frequently in the night as in the day. He remained in this state, sometimes worse but never better, and in 1795 had a very severe attack of strangury, which lasted several days, and very nearly carried him off.

In October, 1795, by the intreaties of his friends, he came again to London for advice; the bougie was tried, but the irri-

tation brought on by passing it fourteen times sufficiently proved that nothing could be effected in that way. Dec. 10th, Mr. Heaviside, who attended the patient, proposed the use of the caustic, and desired that I might be consulted. Recourse was had to the caustic. It was applied to a stricture at the distance of three inches, which was got the better of by four applications; one a little further on required six; a third about $6\frac{1}{2}$ inches required eight, and when the caustic passed beyond it a longitudinal groove was formed in the side of the bougie. A fourth stricture was met with, and this after two applications allowed a small flexible gum catheter to go into the bladder, through which the urine passed so as to empty it: this had never been the case for ten years, the bladder always remaining half full, only throwing off the superfluous quantity. It now remained quiet till it had become filled to the usual standard, which required three hours, and then a desire to void the urine came on. Two more appli-

cations of the caustic admitted a common sized flexible catheter to pass into the bladder, which was allowed to remain there, to interrupt the habit the bladder had got into of not contracting so as completely to empty itself. From December the 10th to January 27th, a period of forty-eight days, the caustic was applied in all twenty-two times. When its use was begun, he made water with great straining, and after he had done, some mucus came away, which had been supposed to be semen. After the first stricture was destroyed there was less straining, and after the second less mucus; and the intervals sometimes exceeded an hour. While the caustic was applied to the two last strictures, after every application there was a rigor, attended with fainting and great depression; this did not happen after the use of the caustic was left off, and the flexible catheter was passed into the bladder. His appetite gradually mended, his bowels became more regular, and he recovered strength. On February 15th he

dined out of his own room for the first time.

His urethra, which for ten years could not bear a bougie half an hour at a time, after the use of the caustic, bore, without any uneasiness, the flexible gum catheter, which is a harder instrument, not only for hours, but for a fortnight, producing no sensation or irritation, although it kept up a discharge similar to that which attends the use of the bougie.

The bladder was free from the discharge of mucus, and other symptoms of irritation, but there was always a pain in expelling the last drops of urine.

April 3d, he used the decoction of uva ursæ, and continued it for a fortnight, to lessen the irritation in the bladder, but did not reap the smallest advantage. He now took compound lime water, four ounces twice a day, and after two days took it in the same dose three times a day.

The lime water apparently did nothing. He then took the caustic alkali, thirty drops

twice a day. April 20th, the catheter did not pass so readily, and the caustic was once more applied, without bringing on any irritation, which allowed the catheter to pass with ease.

He now went to Greenwich; and it was thought some advantage might be gained by making the passage still wider. With this view, May 5th, the caustic was again applied upon a bougie larger than one which had stopped at the stricture. After remaining there some little time, this bougie went on to the bladder, which shewed that a spasm had stopped the other, and that the caustic removed the spasm. This however did not give relief. June 20th, the passage again contracted, and I again applied the caustic, which grated against something just before it entered the bladder; this led me to suspect a stone near the neck of the bladder, and upon passing a solid silver sound, the stone was distinctly felt. I now explained to the patient that a small stone lodged in the urethra accounted for

all his symptoms, the stone never leaving the orifice of the bladder in an easy state. In his weak condition I did not venture to propose an operation, but left him to decide whether his present sufferings were such as to exceed the risk attendant upon removing the stone.

I advised him to take a fortnight to turn this in his mind, at the end of which time I would call upon him. Before that period elapsed an inflammation took place in the perinæum, the parts swelled to a considerable size, and the scrotum became enlarged. I was sent for, and found the urine had got into the cellular membrane. An operation now was not a matter of choice, but of necessity. On July 4th I made an opening in the perinæum, and extracted a stone about an inch long, pointed at one end, which lay in the neck of the bladder, and rounded at the other, which lay towards the stricture. One side of the stone was grooved by the action of the caustic, and stained of a black colour.

After the operation a flexible gum catheter was left in the bladder, he made water less frequently, and had little pain.

Things appeared to be going on favourably, but he was very low. On the fourth day he slept for five hours, which had not happened for ten years; on the fifth, fever came on, and on the sixth he died.

CASE IV.

Stricture and Stone in the Urethra.

William Albany, a labouring man, fifty years of age, was admitted into St. George's Hospital, on the 6th of January, 1796, on account of a stoppage of his urine, and was put under my care. Twenty years before, he had a difficulty in making water, which had been relieved by medicines, and in a little time he thought himself well. He continued so till July, 1795, when the same complaint returned, an abscess formed in perinaeo, which burst and gave vent to the urine; but it

also was voided per anum. In this state he went into the Winchester Infirmary, and remained there without deriving much benefit, which was the reason of his being sent, by a very indulgent master, to St. George's Hospital.

When I first saw him the parts in the perinæum were so much thickened by disease, that nothing could be learned from any examination, and the urine came wholly by the anus and perinæum, at very short intervals, the bladder being in an irritable state. On passing a bougie I found a stricture in the urethra, which I destroyed by the caustic. I then found a second, which was also destroyed; after this the bougie passed on readily, but instead of going into the bladder, went into the rectum; the flexible gum catheter did the same, and the wind from the bowels passed through it. I endeavoured in vain by different trials to get into the bladder; but when I used a solid instrument, much curved, I came against something hard, which explained

the case to be stricture, with a calculus lodged between it and the bladder. I proposed to the man to have it removed, to which he very readily submitted, as life in the present state was insupportable. The operation was performed on the 8th of February, 1796; a staff was passed down to the stone in the perinæum as a direction for the knife, and the stone was readily removed without cutting into the bladder; but that viscus was afterwards examined by a sound. This was easily done, as the cyst inclosing the stone had a very large opening of communication with the bladder, and a smaller one with the rectum. The stone was perfectly spherical, and its surface covered with innumerable spiculated crystals, very sharp and strong. As soon as the stone was removed, a flexible gum catheter was introduced from the orifice of the glans penis into the bladder, and left there.

On the fourth day after the operation he had symptoms of fever, and the catheter

gave so much uneasiness, that it was thought right to remove it; on the fifth he was better, and was ordered porter and nourishing food; the wind from the bowels all passing through the wound instead of the anus, gave it a foul sloughy appearance.

On the ninth day the orifice in the rectum was healed up, and the wound put on a better appearance; on the thirteenth day he walked about three hundred yards, and got cold, had a very severe rigor, and on the tenth day the scrotum swelled, and an abscess, which had formed in the deeper seated parts, burst. He now got a little better; but on the fortieth day an abscess formed in the buttock, which broke and discharged a great deal of matter.

The hospital was now found to disagree with him, and he was sensibly declining in his health. He was removed from the hospital, and got so much better as to be able to be moved into the country.

On the 20th of June he could walk about with a stick, and retain his urine two hours,

a great part of it coming the right way, and he appeared out of danger from the effects of the disease and operation; but two or three days after, by exposing himself to cold in the evening, he was seized with a severe fever, attended with vomiting of bile, voided a large worm and a quantity of blood by the anus, and on the 30th died; having lived near five months after the operation.

CASE V.

Stricture and Stone in the Bladder.

John York, aged sixty-six, had for several years a complaint in the bladder, and for the last eighteen months great frequency in making water, attended with pain, difficulty, and a discharge of viscid mucus.

In this state he came to London, from an idea that his complaints arose from stricture, and that the use of the caustic might relieve them. He was admitted into St.

George's Hospital in May, 1797. I passed a bougie, which met with an obstruction about $5\frac{1}{2}$ inches from the orifice, and began the use of the caustic; but the air of the Hospital disagreed so much with him, coming immediately from the country, that he lost his appetite entirely, and in six days was obliged to go out. The use of the caustic was however continued, and this stricture, by several different applications of the caustic, was removed: another stricture was met with about $6\frac{1}{2}$ inches, which was also destroyed in the same way. The caustic altogether was applied twenty times. His symptoms were not however removed with the strictures, which led me to suspect a calculus in the bladder; for it is remarkable, that in all the cases of stricture and stone which have come under my care, the removal of the strictures has rather aggravated the symptoms of irritation in the bladder. I examined the bladder by sounding him, and very distinctly felt a stone, which fully explained the continuance of the symp-

toms. As he was very infirm, and could not live in an hospital, I did not propose an operation, but sent him back into the country, to take up the internal use of the caustic alkali, with a view of palliating his distresses, which he was not in a state to have removed.

CASE VI.

Stricture and Stone in the Bladder.

A gentleman, aged sixty-one, had a stricture and irritable bladder, for which he had been under the care of different physicians, and had gone through courses of bougies; but still his complaints remained the same. He had been sounded for a stone, but none was found. The complaint was considered as a complication of stricture, diseased prostate gland, and irritable bladder.

The symptoms were frequency in making water, pain after it was voided, discharge of a glairy fluid from the bladder,

and frequent paroxysms of fever and irritation, which made his life miserable.

Under these circumstances he consulted me in September, 1796, and a stricture was discovered at $6\frac{1}{2}$ inches from the orifice of the urethra. I told him that the stricture must be removed, before it could be ascertained what were his other complaints.

For this purpose I had recourse to the caustic; four applications entirely removed this stricture, and allowed a bougie of a full size readily to pass into the bladder; the symptoms were not however at all diminished.

I explained to the patient, that the stricture having been removed, and the bougie with ease entering the bladder, proved that the prostate gland made no part of the disease, since any enlargement of that gland would have stopped the end of the bougie, and prevented it from going into the bladder; there must therefore be some disease in the bladder. I wished for these reasons to sound him again, as that operation could

have been but very imperfectly performed, while the urethra was in a contracted state, as the instrument must have been grasped by the stricture, so as to render it impossible to examine the bladder. To this he assented. The sound passed with great ease, and a stone was distinctly felt; this I removed by the common operation for the stone, assisted by Mr. Cline, and the patient got well in five weeks, and returned to the country. The stone was large, oblong, and very hard.

The caustic, in this case, by removing the stricture enabled me to examine the bladder, and ascertain the nature of the disease, which before had been attempted in vain.

CASE VII.

Stricture and Stone in the Bladder.

In August, 1795, I had under my care, in St. George's Hospital, a boy only six years old, with a stricture in the urethra of three years standing. Upon examining the parts, I found two obstructions, one on this side of the bulb of the urethra, which admitted a very small bougie; another at the bulb, which was impervious to the bougie, but gave passage to the urine in drops, and in very small quantities at a time. The parents of the child said, that the disease was the stone; that the surgeon had sounded him a year and a half ago, and felt a stone in the bladder.

The strictures were destroyed by the caustic; the symptoms of an irritable bladder still remained, but his parents took him away from the hospital before the state of the bladder was examined. The symptoms

increased so much that his life was despaired of; and in this state he was again received into the hospital, but died before any thing could be attempted for his relief.

Upon examining the parts after death, the cavity of the bladder was found entirely filled up by two large stones, which, after they had become dry, weighed six drams.

From the history of the case, there can be no doubt of stone being the original disease; and, from their hardness and size, they were most probably for some years in the bladder before they arrived at that state.

Another case of stricture occurred to me in St. George's Hospital four years ago, where there was also stone; the stricture was dilated by the bougie, an irritable state of bladder came on, and the patient died. It was then discovered that a large stone was the cause of the irritation and of the patient's death.

CASE VIII.

Stricture and Stones in the Urethra and Bladder.

A gentleman, who had for many years found an obstruction to his urine, at the age of seventy-six came to London to apply for relief. At this time his urine passed from him involuntarily, and in consequence of coming a journey of fifty-three miles in an open carriage, and in rainy weather, he caught cold, and immediately on his arrival had a rigor and swelling in the perinæum; this in two days increased to a considerable size, and had an evident fluctuation in it; as the urine had found its way through into the perinæum, it was immediately let out with the point of a lancet, and the swelling subsided. Upon passing a bougie along the urethra, it readily went five inches, and there met with an obstruction; to this the caustic was

applied twice, it gave no pain, but rather a warm and pleasant sensation; it was applied three different times, but the abscess in perinæo, at his age, and a long continued state of disease, brought on symptoms of irritation, of which he died.

On examining the parts, the bladder was found contracted into a small cavity, its internal membrane in a very unnatural state, soft, spongy, and extremely vascular, it contained a large stone nearly round, with a crystallized irregular surface. Just before the neck of the bladder, extending nearly to the bulb, was a cavity formed in the membranous part of the urethra, which contained twenty stones. This cavity appeared to be formed directly behind a stricture, in the usual situation, seven inches from the external orifice.

About two inches further on, towards the external orifice, there was another stricture, and directly behind it a small oval black stone, weighing five grains when dry, there being a dilatation of the canal

in that part. This proved that it had acquired a considerable increase of size in this situation; there were also three smaller stones in the same situation, about the size of shot.

— The twenty stones contained in the urethra, behind the last stricture, were faced and smooth, so that they must have had considerable motion on each other.

From this fact it appears that the original disease had been the stone; that a small stone had got into the urethra, but had been unable to pass along it, from its having irritated the membrane that lines that canal, and produced a stricture. This stone had been followed by others, and the space became enlarged to contain them, till at last the whole number amounted to twenty, and their sides had been made smooth by rubbing against each other. In this state the patient had gone on with less distress than in many other cases of stone; for all these stones, as fast as they formed in the bladder, got readily into this bag, and the

urine passed over them, though not with ease, without a total stoppage.

One stone, however, continued in the bladder, having become too large to pass out, and remained increasing to its present size, and from the irregularity of its surface, kept up a constant irritation. One of the small stones which escaped from the bladder, had got beyond the original stricture, and was arrested in the situation of the second stricture, where it remained dilating the canal as it enlarged. There were also three other very small ones, which proves that lesser calculi were escaping all this time. The strictures in this instance were in the usual situations, five and seven inches from the orifice, and behind each of them were calculi, also one large one in the bladder; it must be therefore allowed more probable, that the calculi were the causes of the strictures, than the reverse.

If in this case recourse had been had to the caustic at a more early period, the disease might have been ascertained to be the

stone : but in no other way could that have been done, as a bougie, in parts so much irritated, could never have dilated the canal so as to admit a solid instrument to strike against the stone, and discover the nature of the disease.

CASE IX.

Stricture and Stone adbering to the Bladder.

Benjamin Pooly, aged twenty-six, a gentleman's servant, in the month of February, 1795, had a gonorrhœa, for the relief of which he applied to an unskilful person, who gave him an injection ; a few hours after using it he was seized with a violent pain in the region of the bladder, and had a total suppression of urine. This last complaint was so distressing that he was obliged to go into the warm bath, which took off the suppression. The irritation on the bladder was not relieved by passing the urine, but continued very se-

vere, and there was a discharge from the bladder like the white of an egg, which followed the urine in considerable quantity. The urine was generally turbid, and upon standing deposited a sediment. He also passed it with pain, particularly the last drops. These symptoms continued for a year without abatement, although a variety of medicines had been used for their relief.

In Feb. 1796, he came into St. George's Hospital, and was under my care. Upon examining the urethra, there was a stricture about $5\frac{1}{2}$ inches from the external orifice; this was removed by the caustic, and there was another about six inches, which was also removed. When the bougie passed into the bladder, it brought on a considerable hæmorrhage.

The symptoms in the bladder were rendered milder by the removal of the strictures, but by no means cured; the pain in making water continued, and the frequency was very great, but it passed with less dif-

ficulty and less straining. These symptoms were relieved by the use of the common bougie, which was continued for three months.

Finding himself much better, he left the hospital. After he returned to his master his urine began to come away involuntarily, and without pain. This increased upon him, till at last he was unfit to remain in service, and returned to the hospital in January, 1797.

An instrument passed readily into the bladder, but met with something hard at the entrance of that viscus; it seemed to be a stone in the neck of the bladder, as the instrument in passing on got beyond it.

This circumstance explained the want of retention of the urine, as the neck of the bladder was kept open by the stone, and the sphincter vesicæ prevented from doing its office.

I explained this to the patient, and told him nothing but an operation could afford him relief.

He readily submitted to have the stone removed, and the operation was performed on the 28th of January, 1797.

When the forceps were introduced into the bladder, I readily laid hold of the stone, but as soon as I had brought it to the orifice of the bladder the forceps slipped off; this happened several times. I passed my finger into the bladder, and while the abdominal muscles were pressed down by an assistant, I could distinctly feel the stone; but when that pressure was removed, it withdrew out of my reach; it receded with the anterior part of the bladder to which it adhered. After bringing away portions of it by many different trials, I at last with a strong pair of polypus forceps, brought out the nucleus. The operation lasted nearly half an hour, and the quantity of fragments altogether brought away, when dry, weighed nearly an ounce; and upon examining the bladder with the finger, no remains of stone could be felt.

The patient was put to bed. He had the

symptoms of inflammation, to be expected from so severe and tedious an operation, and part of the skin of the penis and scrotum sloughed off; but at the end of three weeks he began to recover, the sloughs were all separated, and the surface put on a healing appearance. His appetite was good; he drank a bottle of wine and a pot of porter, and was able to sit up for a few hours every day; his sleep tolerably good. While he continued in this state, he was disturbed by a patient in a delirium in the same ward; he lost his sleep, and was attacked by a diarrhoea: about the twenty-eighth day after the operation his health was evidently declining. I proposed having him removed from the hospital, of which he was very desirous; this was done on the thirty-second day. He bore the moving very well, in a chair, was refreshed, and felt himself better. The wound, which had never shewn any disposition to heal, but had its sides covered with coagulating lymph, incrusted with calculous matter, now put

on a more healthy appearance. On the thirty-fifth day from the operation he appeared tolerably well, and in good spirits; but all at once complained of being low, and died in half an hour.

Upon examining the body, the immediate cause of death appeared to be a deep seated abscess on the inside of the pelvis of the right side, probably the consequence of the weak state consequent to the operation.

The contents of the abdomen were free from disease, and the bladder externally was in a natural state; but on being laid open, it exhibited a very uncommon appearance. At the fundus it was entirely free from disease; but towards the neck the internal membrane, all round for a space of $3\frac{1}{2}$ inches, extending to the prostate gland, was covered with a layer of coagulating lymph, the surface of which was very irregular, the projections in some places three-quarters of an inch long: the whole of this new substance was incrustated with calcu-

lous matter, in a soft state, with which the stone had been connected. The cavity of the bladder at this part must have been nearly filled up by the stone, and the coats too much consolidated by previous inflammation to admit of being dilated.*

It appears from the history of this case, that the injection employed for the cure of the gonorrhoea, had brought on inflammation upon that part of the internal membrane of the bladder with which it came in contact, and an exsudation of coagulating lymph was thrown out over that surface. This corresponds with the result of an experiment made by Mr. Hunter, in which the vagina and uterus were inflamed by an injection of corrosive sublimate, and a similar exsudation of coagulating lymph was found upon the internal surface.† This new-formed substance, which possessed in

* See Pl. III.

† See Hunter on the Blood, Inflammation, and Gun-shot Wounds, page 242. Pl. VIII.

a very small degree the principle of life, admitted the calculous matter to adhere to its surface, and form a stone of a very loose texture, which became suspended by these attachments to the bladder, just within its cavity, immediately beyond the prostate gland.

There is a calculus in the bladder of a horse, in the collection of Dr. Marshal, which adheres in the same manner, and it is easy to trace the portions of coagulating lymph from the surface of the bladder into the substance of the stone.

This case explained to me, what I could not before understand, how a stone can have a firm attachment to the coats of the bladder. Of the fact there are so many instances upon record, that it was impossible to doubt that it sometimes happens; but no mode of accounting for it, which I have met with, is at all satisfactory. Mr. Le Dran denies the possibility of stone adhering to a living surface, yet he supposes that fleshy excrescences lodge themselves in the cavi-

ties of the stone; which excrescences under such circumstances would be absorbed.*

* The following is the account given of the adhesion of stones to the bladder by the celebrated Le Dran.

“ I am thoroughly sensible of the impossibility that
“ an animated body, which subsists by a circulation of
“ fluids, and another body which owes its bulk en-
“ tirely to an apposition of matter, should become one
“ and the same by any kind of adherence, let it be ever
“ so strong.”——“ That there are stones which ad-
“ here, I make no doubt, because I have seen instances
“ of them: but these adhesions are not of that nature to
“ prevent the extraction of a stone, provided it can be
“ laid hold of with the forceps. In 1736, I cut a lady,
“ and extracted a stone that weighed $7\frac{1}{2}$ ounces, one
“ side of it was uneven, likewise 3 inches long, and
“ $2\frac{1}{2}$ broad, and was in a manner entirely incrustated
“ upon that part of the bladder that is connected to the
“ intestinum rectum. This incrustation was occasioned
“ by the inequalities of the stone, which had produced
“ an excoriation of that part of the bladder upon which
“ they pressed; and in consequence thereof, a number
“ of fleshy or fungous excrescences arose from this ulcer,
“ and had lodged themselves in these cavities of the
“ stone!”

Operations in Surgery of Mons. Le Dran, translated
by Gataker in 1749, p. 206.

It was not known, when he wrote, that violent inflammation upon the internal surface of the bladder produces an exsudation of coagulating lymph, and not ulceration ; the knowledge of this fact removes completely every difficulty, since this effect of inflammation interposes between the stone and the bladder a substance that receives blood vessels from the bladder, with which it adheres ; but these do not extend through its substance, so that the opposite surface is hardly possessed of any active powers, and readily admits of incrustation. Another instance of this is given in the following case.

CASE X.

Stricture and Tumour in the Bladder, with a small adberent Calculus.

A gentleman, aged sixty-nine, had for two years occasional complaints in the bladder, which were supposed to be gouty. In

the spring of 1796, he made bloody water, which continued a short time and then went off. It returned again in the spring of 1797, attended with great pain in making water, which was voided very frequently. The pain increased, and the water was more bloody, so as to give the alarm of a serious complaint forming in the bladder, and from the frequency of making water a stricture was suspected to have formed in the urethra. On this account I was consulted on 17th June. He stated, that he made water every half hour, that he had great pain at the time, but more particularly after it was voided; the pain was a burning heat in the glans penis. He had less of this if the water was voided lying, and least when he lay on the left side. These I said were symptoms of disease in the bladder, and not of stricture; if therefore he had a stricture, it was a secondary complaint, in consequence of the disease in the bladder.

Upon examining the urethra by a bougie, it passed readily five inches, but no further;

the urethra was very tender, yet the pain occasioned by passing the bougie soon went off.

I proposed removing the stricture, and mentioned that there was another nearer the bladder. I stated at the same time that I did not believe their removal would at all relieve the symptoms; it was, however, a necessary step towards gaining some knowledge of the state of the bladder, which till that was accomplished could not be examined.

This was agreed to; and I applied the caustic to this stricture, which was removed by two applications; there was another at six inches, which was also removed by two applications, and the bougie went into the bladder, but in doing so gave considerable pain.

The original complaints were daily increasing, the urine contained nearly as much blood as water, and the quantity voided at each time was scarcely an ounce. This led me to suspect that the bladder did not

wholly empty itself at each time; with a view to ascertain this I passed a flexible gum catheter into the bladder, but little more than an ounce of water was drawn off. The end of the instrument, in passing into the bladder, rubbed upon something rough, and in coming out the opening or eye of the catheter caught hold of and brought away a small irregular portion of a calculus. This rendered it certain that calculous concretion formed a part of the disease in the bladder; and as the stone, from what came away in the catheter, and two or three small portions which had at different times been voided since the strictures were destroyed, was of a soft kind, it was thought probable that its irregular surface irritated the bladder, and brought on the present distressing symptoms.

In this state, with a diseased bladder and declining health, little or no appetite, and a great degree of constitutional irritation, which was termed fever, proposing an operation appeared too hazardous, it was there-

fore recommended to try the different solvents; the caustic alkali disagreed with his stomach; the lime-water answered better; but the abatement of the symptoms in the bladder was small, and his health more and more reduced; the alkaline mephitic water in small doses agreed with the stomach, but in larger quantities brought on a purging. He now felt within himself a conviction that medicines could not afford him relief, and that he was very rapidly sinking; if therefore there was any chance from an operation, he wished to undergo it. Mr. Earle was called in consultation, and the patient was sounded for the first time; the instrument rubbed upon a soft stone; this was felt both by Mr. Earle and myself, but only in one direction, as if it had been confined in a particular part of the bladder. The pain and distress brought on by sounding the bladder was so great, that it required a week to recover from the effects of it; and at this time his appetite was so bad, and he was reduced so low,

that there was a doubt of his being able to go through the operation ; and the day previous to that fixed on for that purpose, he had sickness and a fit of lowness, that did not go off for the greater part of the day.

The operation was however performed, at the patient's earnest request, on the 10th of August, in which I was assisted by Mr. Earle. When the forceps were introduced, I felt them rub against the stone, and laid hold of it, but it gave way to the pressure of the blades ; and upon withdrawing them, there was a small quantity of stony matter, and some soft pulpy substance, brought away. I then introduced my finger, and felt a soft irregular excrescence, but nothing like stone ; Mr. Earle felt the same ; the bladder was examined by the sound, and there being no more stone the patient was put to bed.

The knowledge I had acquired from the preceding case prepared my mind, and enabled me at once to comprehend the na-

ture of the disease, without distressing the patient, or prolonging the operation by a further investigation.

The quantity of stony matter extracted, when separated from the other substance and dried, did not weigh more than thirty grains.

The operation, after its immediate effects went off, relieved him from the excruciating pain he suffered ; his water became of the natural colour, without the least tinge of blood ; and when it passed, although at times it gave pain, at others it did not.

On the eighth day after the operation he was able to be moved into the next room, and lay for several hours upon the couch ; every thing appeared to be going on well, but he was unable to take medicines, except opiates and laxatives. Bark and all bitters were unpleasant to his palate, and took away the little appetite he had ; they were therefore left off.

Every means to promote his appetite proved ineffectual ; he could fancy nothing

but a few grapes, and these affected his bowels, so that his nourishment consisted of broths, jelly, and small quantities of wine. He was daily moved into the next room; his urine never became tinged with blood; but on the twentieth day after the operation, from want of being able to take sufficient support, he died.

Upon inspecting the parts after death, a tumour of the steatomatous kind had formed in the coats of the bladder, where the right ureter entered it; this had increased in size to the thickness of $1\frac{1}{2}$ inches, two inches in length, and the same in breadth; the surface towards the cavity of the bladder was concave, and in a state of ulceration; the lower end of the tumour projected a little from the internal membrane of the bladder, was covered by a layer of coagulating lymph, and the calculous matter had concreted upon this part. There was also a layer of coagulating lymph laid over the membrane of the bladder from this end of the tumour to the prostate

gland, about an inch and a half in length, the external surface of which was incrust-ed with calculous matter ; the other sur-face was attached to the lining of the blad-der, but could be separated from it without any injury to the membrane, except divid-ing small blood vessels. This surface was of a red colour and very vascular. So that in this case, as in the preceding, no part of the membrane of the bladder had any cal-culous matter adhering to it ; but where the inner coat was covered by a substance pos-sessed in a less degree of the principle of life, there the incrustation took place.

The tumour had obliterated the orifice of the right ureter in the bladder ; the pel-vis of the kidney and the ureter were very much enlarged, and contained above half a pint of matter. As the stomach sympathizes in a great degree with almost every affec-tion of the kidney, the diseased state of that organ accounted for the stomach be-ing so much affected, and never recovering itself.

The disease being on the right side of the bladder, and the right ureter imperious, accounted for the pain being less in making water when lying on the left side, as the urine entered the bladder on that side, it was not liable in passing out through the penis to come upon the ulcerated surface of the tumour.

SECTION IV.

CASES OF STRICTURE INFLUENCED BY GOUT.

THE following Cases shew the great irritability gout, in some constitutions, brings upon the urethra.

It has been supposed, that gout falls upon the urethra in the same manner as upon any other part of the body, but the instances of such an occurrence are too few in my opinion to establish the fact. There can be no doubt, from the evidence of the following Cases, that gout is capable of affecting a diseased state of the urethra, and bringing on fits of irritation, or increasing the symptoms of that disease. How far it can produce similar effects upon a perfectly sound urethra, I am unable to determine.

CASE I.

A gentleman, between fifty and sixty years of age, who had frequent attacks of gout, had at those times a difficulty in making water, and was obliged to pass a bougie of a small size. His stream of urine was always small, but the passing it in general not attended with difficulty; while in a warm climate he had been a year without using a bougie; this he was at other times obliged to do occasionally, sometimes once a day, or once in two or three days.

He put himself under my care, and had the caustic applied to a stricture at six inches; this was removed by three applications; when this stricture was destroyed, the bougie passing through it brought on a strangury, which was removed by the warm bath. Another stricture was met with at seven inches. After four applications this second stricture was destroyed.

The bougie passing into the bladder produced irritation, attended with frequency in making water, which lasted for half an hour. When this went off he felt himself very well, and had an ease about these parts which he had not felt for years.

Two months after, the same bougie passed into the bladder, but with a degree of difficulty, which induced me to apply the caustic again; this brought on a good deal of irritation at the moment, and was followed by a suppression, which went off while the patient was in the warm bath. The irritation subsided, and he was very well; but soon after he had an attack of the gout, which again brought on suppression, and required the use of the bougie. When the gout went off, he made water very well, and a bougie passed readily into the bladder.

The gout in this case acted on this part of the canal, producing a spasmodic contraction, in the same manner as a blister applied to any part of the body, in many people brings on strangury.

CASE II.

A gentleman, about forty years of age, had strictures for several years, which required the use of a small bougie occasionally; but generally in the spring he had a severe attack attended with suppression.

In 1796 he put himself under my care. The urethra was very small in itself, and there was a stricture three inches from the external orifice. The passing the bougie gave pain; but the caustic was so little felt that he doubted much that any thing was really applied; this stricture was removed by three applications of the caustic, and afterwards other two strictures in succession, the whole of them requiring about twelve applications of the caustic.

As the urethra was small, it was explained to him that he was more liable than others to a return of the stricture. I therefore requested to see him three months after, when the same bougie passed into

the bladder, but not with perfect ease. I then proposed to him to have the caustic applied again ; but he continued so well that he did not attend to my advice. In the following spring he had the gout flying about him, and all at once was taken with a difficulty in making water, and great irritation in this part, which induced him to send for me. When I attempted to pass the former bougie, it gave so much pain in going along the canal, before it came to the seat of the first stricture, that he was unable to bear it, so extremely irritable was the internal membrane at that time. I passed one of a smaller size, which still gave pain ; this was much greater than that produced by the caustic, which was immediately after applied to the second stricture that had become spasmodically contracted. Two applications of the caustic removed the strangury, and it was then proposed to do nothing more, as a fit of the gout was come on, but to leave the parts to themselves till the influence of that dis-

ease was gone off. Since that time I believe he has had no return of strangury.

CASE III.

A gentleman, about thirty years of age, applied to me for relief from a stricture. To ascertain that such a disease existed, I passed a bougie ; this gave a very uncommon degree of pain ; and as there was a stricture at five inches, I applied the caustic to it. The pain he expressed was beyond what I had ever known. He said it was insufferable. Two days after he called upon me, his hand much swelled from a violent fit of the gout. This explained to me the very severe pain he felt from the bougie, and also from the caustic. I therefore desired he would leave the treatment of the stricture till the gout was entirely gone off.

Six months after, the treatment of the stricture was renewed ; the caustic gave

pain, but by no means very severe, and its use was continued till the strictures, which were two in number, were destroyed; for this purpose it was applied twenty times. Two months after I examined the canal, which was perfectly free from any obstruction, but he had not in the interval been attacked by the gout; so that it remains to be ascertained whether it will have any effect on the seat of the stricture.

SECTION V.

CASES OF HYDROCELE CURED BY THE
REMOVAL OF STRICTURE.

THAT there is a peculiar sympathy between the actions of the urethra and testicle, when either of these parts is diseased, no practitioner who has had any experience in the treatment of gonorrhœa can be ignorant of, since a swelling of the testicle is a common symptom in that disease. Many other applications to the urethra, which produce irritation, bring on a swelling in one of the testicles; this frequently happens from the use of the bougie.

As an irritation of a certain degree of violence produces a swelled testicle, so one of a slighter degree sometimes brings on and keeps up an uneasy and enlarged state of these glands, which subsides when that irritation is removed. A well marked case

of this kind has lately been under my care. A gentleman whose testicles had become unusually large, and remained in an uneasy state for many months, although different modes of treatment had been adopted, put himself under my care. In stating all the circumstances of his complaints, he mentioned his not making water freely, which led me to suspect a stricture; this suspicion proved to be well founded; I therefore suggested the idea, that the uneasy state of the testicles depended on the stricture, and wished nothing might be done till the urethra was enlarged. This was no sooner effected than the testicles became perceptibly smaller, and lost in a great degree the uneasy sensations to which they had been accustomed.

This sympathetic connection between the state of the urethra and of the testicles, I believe to be still more extensive, as the following Cases shew, that in some instances hydroceles are cured by strictures in the urethra being removed, which makes

it natural to suppose, that if no stricture had been formed, these patients would not have had the hydrocele.

I would not be understood, to suppose that, wherever strictures and hydrocele occur in the same patient, the hydrocele is a consequent disease; as in many cases I believe the two complaints are independent of one another. That they are ever connected is, I believe, a new idea; I therefore do not wish to hazard any opinion respecting the frequency of such a connection, but shall endeavour by cases to establish that it does sometimes occur.

CASE I.

A gentleman, aged forty-nine, while resident in one of the Windward Islands in the West Indies, in the year 1778, was seized with a strangury, for which opening medicines, glysters, and the warm bath were used, but without effect; the warm

bath was repeated, and blood was taken from the arm, and at the end of nine hours the spasm went off and he was relieved.

From that time he had difficulty in passing his urine; in 1782, he discovered a swelling in the left testicle, which proved to be a hydrocele. In the end of 1796, he arrived in London, at which time the hydrocele was four inches long and eleven in circumference. He had a difficulty in passing his urine, attended with a discharge of matter from the urethra, and an involuntary discharge of urine, which had for the last seven years been very distressing.

In Dec. 1796, he put himself under my care, and had the operation for the radical cure of the hydrocele performed, by means of an injection of equal parts of Port wine and water. The inflammation came on in twenty-four hours, and had entirely subsided in fourteen days; but the swelling remained without abatement. As the stricture was to be removed by the caustic, it was proposed to suspend all treatment of the hydrocele till

that was accomplished, and if it did not subside in that time to repeat the operation.

The urethra was examined the 10th of January, 1797, and it was found that this canal, near the external orifice, was preternaturally contracted, so that the bougie did not pass above an inch before it met with an obstruction; the caustic was applied to this, and to others in succession. About the 16th of February the bougie could pass five inches, and the symptoms of the stricture began to abate: there was less of the urine discharged involuntarily. The hydrocele was now perceived to diminish. The use of the caustic was persevered in, and on the 16th of March the urine flowed with less straining. The hydrocele had now diminished one-third of its size. By the 16th of April, it was lessened one half. The stricture at six inches gave way to the caustic very slowly; but according to the progress of the cure the hydrocele became smaller; and on the 16th of May it was entirely gone. On the 14th of June, a bougie

passed into the bladder, and afterwards a flexible catheter nearly the size of the urethra. The caustic had been applied seventy-eight times. The operation for the hydrocele was performed December 27th, the inflammation was entirely gone January 10th, and the hydrocele was then the same size as before the operation, nor did it sensibly diminish for a month; and did not subside entirely till near five months after the operation; but the progress of its diminution kept pace with the removal of the stricture.

CASE II.

An officer, nineteen years of age, who was going to America to join his regiment, consulted me for a hydrocele, which he was desirous of having removed before he went abroad. It was of a small size, and he attributed a gleet which he had at the same time to this affection of the testis.

The gleet, on examination, proved to be

the consequence of a stricture. As soon as this was ascertained, I explained to him that the stricture was the more serious of the two complaints, would require the longest time to be removed, and when it should be cured, the hydrocele might possibly get well. I therefore proposed to take up the stricture first, and leave the treatment of the hydrocele till after the stricture should be destroyed.

The caustic was applied to the stricture ; this was repeated ten or twelve times, and the obstruction in this way was removed. As soon as the cure was completed, I examined the testicle, and had much pleasure in finding that the hydrocele had disappeared. This was very flattering, but I told him was not to be relied on, as it was probable that the hydrocele might return. He was, therefore, to let me see him a few weeks before he left England, (which was not to be for some months) that we might ascertain whether it was disposed to return. He called upon me three months after, and

there had been no return of the hydrocele ; so that the removal of the stricture disposed the absorbents of the testis to carry off the water from the cavity of the tunica vaginalis.

CASE III.

A gentleman, aged fifty, who has laboured under the symptoms of stricture for many years, had the urethra so much obstructed in the early part of the year 1796, that the water passed with extreme difficulty, accompanied with symptoms of great irritation. At this time a hydrocele came on, which the patient conceived to be the water forced by the straining into the scrotum.

In May, 1796, he put himself under my care for the strictures. I found one $3\frac{1}{2}$ inches from the external orifice, which I destroyed by the caustic. The hydrocele was at this time so large and tense, that I proposed to him, when he should have leisure in

the autumn, to have it removed by an operation, as it was becoming very troublesome ; in the mean time I persisted in the use of the caustic. In this, however, our progress was very slow, as he lived at Wapping, and was engaged in a business which made his calling upon me very precarious. The symptoms of the stricture have, however, been much abated, and its aperture a good deal enlarged ; although it is not even now completely destroyed, notwithstanding the caustic has been applied to it above forty times. But the remarkable circumstance is, that the hydrocele is not one half the size it was in May, 1796, is flaccid, and is lessening perceptibly every month ; so that there is great reason to believe, that when the stricture is entirely destroyed, it will be completely removed.

CHAPTER VI.

UNCOMMON EFFECTS OF THE CAUSTIC IN THE
TREATMENT OF STRICTURES.

MANY and dreadful are the effects which have been supposed to be produced by the caustic, when applied to the internal membrane of the urethra; sufficient evidence has been adduced, in the different parts of this work, to prove that this is by no means the case.

As the disease differs in its symptoms, and the degree in which these symptoms distress the patient, so the effects of the caustic are also found to vary in different patients; in many, it produces little or no sensation; in others, the pain is acute, and of some continuance. Besides the simple pain that is felt, there are other less common symptoms brought on in particular cases, which will form the subject of the present Chapter.

These symptoms are swelling in the perinæum, hæmorrhage, occasional strangury, and ague ; but they are in general the consequence of some imprudence on the part of the patient. They are such as may alarm the surgeon, and hurry him into the use of means for their removal which are not necessary, or may ultimately do harm, unless he is made acquainted with the cause from which they arise, and is informed that they readily subside under the most simple mode of treatment. With a view to communicate this information, I have thrown together the cases I have met with in which these different symptoms occurred.

SECTION I.

SWELLING IN THE PERINÆUM.

It is not sufficient for the cure of stricture that the canal is made wide enough to give a free passage for the urine; if any projecting parts are left, the stricture is liable to return; the use of the caustic is therefore to be persevered in till these are destroyed. In removing that part of the stricture nearest to the sides of the urethra, it sometimes happens that a swelling of considerable size takes place in perinæo.

The following are the only instances I have met with in which this symptom has occurred. The swelling is totally different from that brought on by the irritation which sometimes arises from a bougie remaining too long in the passage, and which terminates in the formation of abscess; it is

entirely produced by the blood extravasated in the cellular membrane, which is readily absorbed. The inflammation brought on in such cases is very slight, and readily subsides.

CASE I.

A gentleman, aged about forty, in February, 1796, put himself under my care for a stricture; he was of a very irritable habit, and had, in consequence of a hurt received some years before, very uncommon symptoms of constitutional indisposition.

The caustic was applied to a stricture about three inches from the external orifice, which gave way to the second application; a little further on there was another stricture, which yielded to two applications of the caustic. There was a third, which required five applications; and a fourth, exactly seven inches distant from the orifice, which after six applications ad-

mitted a bougie to pass into the bladder, but not of a sufficient size; the applications were therefore repeated six times more: on the last of these the bougie went through, this was followed by a considerable degree of a peculiar kind of pain, that communicated with the rectum and ran down the thigh. This lasted for a few minutes; he made water by drops, and a swelling came on in the course of a few hours in the perinæum. Spirits of wine and camphor were applied, but the swelling continued the same for four days. In a few days more it entirely subsided, after which a full sized bougie passed readily into the bladder.

This swelling must have been an extravasation of blood, otherwise it could not have come on so soon, or have so readily gone off.

The bougie that now passed was uncommonly large; and the gentleman called upon me six months after to say that it passed equally well.

CASE II.

A gentleman, thirty-five years of age, had a complaint supposed to be a gonorrhœa; the symptoms were a discharge, inflammation upon the glans penis, and swelling of the body of the penis. These symptoms had continued for months, attended by frequent irritation to make water.

Under these circumstances a stricture was discovered, and the use of the caustic begun in March, 1796: the stricture was three inches from the external orifice.

Two applications of the caustic destroyed this stricture, and all the symptoms abated. A second stricture was discovered at six inches; this also soon yielded. Another, at seven inches, gave way to the third application of the caustic; this happened at eleven in the forenoon. He now felt an uncommon sensation of a very distressing kind, and in half an hour nearly fainted; was in great pain all day, had a rigor in

the evening, with swelling in the perinæum; passed a very restless night, had great pain in making water, which came away in a small stream, and was voided every two hours. Next morning he had head-ach, sickness, and retching without vomiting. This he was subject to on many occasions, and considered it as bilious; passed a good deal of bile by stool. The fulness in the parts now diminished; and he made water only once in the night. The next day he was less languid; in four days all these symptoms went off, the water flowed in a good stream, and the parts were in a better state than before the application of the caustic.

A fulness remained in the perinæum; but what was singular, the parts laterally, on each side of the penis where it projects on the os pubis, were much swelled and puffed. In this state he went into the country for four days; on his return, the parts in perinæo had subsided, but not those on each side of the penis; a bougie was now

passed, but did not go into the bladder. It was not thought right, in the present state of the parts, to proceed with the caustic. He went therefore into the country. He returned about the end of April; the caustic was once applied, gave much pain, and brought on a tendency to fainting; but the next time it was applied, the bougie went into the bladder.

The pain and slight chordee did not go off for a fortnight. He was, however, after that time perfectly free from both. All the symptoms except the discharge now went off; but that continued, though in a less degree.

In 1797, I passed the bougie, and there was no return of stricture; but the discharge had not entirely ceased.

SECTION II.

HÆMORRHAGE.

ONE of the effects of the caustic in some particular cases, is very profuse hæmorrhage. This symptom, as will appear from the following cases, has several times come under my notice. In every one of them I left the parts entirely to themselves, and the bleeding gradually diminished, till it ceased without producing any unpleasant consequences. This symptom has never occurred with violence but where the stricture was completely destroyed. It has, however, alarmed many surgeons, as well as their patients; and has indeed been considered as one of the strongest objections to the use of the caustic; so much so as to deter many practitioners from employing it.

The great dread that has been entertained of such bleedings, is not on ac-

count of the absolute loss of blood, but lest it should pass into the bladder and coagulate there. This, it will appear, does not necessarily happen ; but as such an event is possible, and the consequences that would arise from it are not generally known, I shall state the following observations on that subject, taken from a paper published in the eighty-sixth volume of the Philosophical Transactions, which I have received permission from the President and Council of the Royal Society to lay before the reader.

As every change the blood undergoes must appear an object of importance to those who study the economy of animals, I am induced to believe the present observations on the change produced on it by being mixed with the urine, will not be considered as wholly undeserving of notice.

I was led to pay attention to this subject from considering the following case, which came under my care.

A gentleman, seventy-one years of age,

in the spring, 1795, found that in making water, the urine had the appearance of blood, and congealed into a solid mass as soon as received into the vessel. This complaint appeared to have arisen from the rupture of a vessel in one of the kidneys, for he had a pain in his loins, but none in the region of the bladder. He seemed to void no water, for the whole quantity which was expelled at any one time, amounting to about four ounces, formed itself into a coagulum; next day he voided bloody water, which did not coagulate. This continued for three or four days, and then went entirely off.

In the spring, 1796, he had a return of the same complaint. It came on in the evening of the 3d of April; on the 4th it was very violent; and in the afternoon there was a total suppression. A catheter was passed six or seven times; but the oval holes near the end of the instrument were always filled with coagulated blood, and no urine could be drawn off. On the 5th, a

larger catheter was passed, with small round holes, less likely to have the coagulum entangled in them, but no urine came away. In the evening it was introduced again, having its cavity completely lined with a flexible gum catheter, which was withdrawn as soon as the instrument was carried to the fundus of the bladder; and in this way four ounces of a bloody fluid were drawn off, which on exposure coagulated.

On the morning of the 6th, a pint of bloody urine was drawn off; this operation was repeated three times in the twenty-four hours, and the same quantity was brought away each time.

On the 7th, the urine drawn off was less tinged with blood; and when it was allowed to stand, the upper part became tolerably clear. There was little change in the circumstances for six days; but on the 13th the urine drawn off was of a darker red colour, and in smaller quantity. On the 16th, the colour was more of a light brown, and after standing some time, a

whitish powder was deposited ; the urine drawn off in the morning upon getting up, was nearly of the natural appearance, but that brought away in the course of the day, had a deeper tinge, and more of the white sediment. It is also to be remarked, that the sediment evidently passed off only with the last part of the urine. On the 19th, the urine was tolerably clear, and the white sediment more completely separated, and in greater quantity. In the course of the night, while lying in bed, the patient voided naturally in many different attempts, four ounces of water, but could not make any when up. The urine now continued clear from any tinge, but no more passed without the catheter being introduced, till the 28th, when he again made some water naturally, but could not completely empty the bladder ; on the 29th, the quantity which required being drawn off was less ; and by the 5th of May he made water as usual, at which time the sediment began to diminish, and gradually disappeared.

From the symptoms which have been stated, it appears that part of the blood which passed into the bladder from the kidney had remained there, and formed a coagulum, which coagulum gave a bloody tinge to the urine, and caused an inability to void it without assistance, till the coagulum was dissolved.

With a view to ascertain how far this had been the case, and discover what changes the blood undergoes when placed in such circumstances, I instituted the following experiments. They were performed by Mr. Charles Grover, a very ingenious surgeon, at that time house surgeon in St. George's Hospital.

Experiment 1. Four ounces of blood were drawn from the arm into a phial containing four ounces of fresh urine, and the phial was kept in the temperature of the human body; in fifteen minutes the whole mixture formed an uniform firm coagulum, and appeared wholly composed of blood.

This experiment was made to ascertain

the probable time the blood would take to coagulate in the bladder.

Experiment II. Six ounces of blood were drawn from the arm into six ounces of fresh urine; in fifteen minutes the whole mass became one solid coagulum. In seven hours, six drams of clear fluid were separated from it; this was poured off, and the same quantity of fresh urine was added; after standing nine hours it was poured off; some red globules were mixed with it, but sunk to the bottom undissolved. The coagulum had fresh urine added to it three times a day, the former urine being previously poured off, and allowed to stand some hours for examination.

For the first five days the coagulum appeared to undergo little change, except becoming smaller in size, and the urine poured off from it was tolerably clear, but on standing deposited a dark cloudy sediment.

On the sixth day, the urine, when poured off from the coagulum, was of a dark red colour, and deposited a greater quantity of

a dark coloured sediment, but on standing became tolerably clear.

On the ninth day, the coagulum was reduced to the size of the original quantity of blood drawn from the arm.

On the thirteenth day, the size of the coagulum was a good deal reduced ; the urine poured off from it was still more tinged with the red globules ; but when allowed to stand, the upper part became clear, and free from the red tinge, and the sediment had the appearance of a whitish powder. From this time the quantity of white sediment increased, and the size of the coagulum diminished. In its decrease from this period the loss was from its external surface, and nearly equally all round ; what remained appearing like the nucleus of the original coagulum. On the twenty-fifth day, it was of the size of a large cherry, and on the twenty-ninth it entirely disappeared. Some red globules were very distinctly seen in the sediment along with the white powder.

To see how far the changes the blood had undergone in this experiment depended on the peculiar properties of the urine, the following experiment was made, with blood and common water.

Experiment III. Six ounces of blood were drawn from the arm into six ounces of water. In a quarter of an hour, the whole became one solid coagulum. In twelve hours, six ounces of a clear water, of a bright red colour, were separated, nor did it on standing deposite any sediment.

This coagulum had fresh water added to it twice a day, and what was poured off was allowed to stand for examination.

The coagulum on the second day began to break; on the fifth had a putrid smell; and in eighteen days was almost entirely dissolved.

The water which was poured off was of a bright red colour from the beginning to the end of the experiment, in consequence of the red globules being dissolved; it had a very offensive smell, but never deposited

any white sediment; the coagulating lymph dissolved from putrefaction.

As it is evident, from the result of the last experiment, that the coagulum remaining so long undissolved in the second experiment depended upon its being mixed with the urine, I was desirous of knowing whether it was the urine incorporated with the coagulum, or that which surrounded it, which produced this effect. To determine this point I instituted the following experiment.

Experiment iv. Four ounces of blood were drawn from the arm into a cup, and allowed to coagulate. Four ounces more were drawn into a separate cup. From each of these equal portions of coagulum, at the end of three hours, one ounce of serum was separated and poured off. To one of them fresh urine was added; to the other common water. The urine and water were changed night and morning.

The water was tinged of a bright red colour throughout the whole experiment,

and deposited no sediment. On the eighth day the coagulum was rather looser in its texture. On the thirteenth day it began to break, and by the twentieth day it was nearly dissolved. The progress corresponding with that of the coagulum in *Experiment III.*

The urine the second day of the experiment was clear, but the bottom of the bason was covered with red globules undissolved.

On the fifth day, the urine poured off was tinged of a bright red colour, similar to the water taken from the other coagulum; and after standing some hours a white sediment was deposited.

On the thirteenth day it was looser in texture, and more dissolved than the coagulum in the water. It continued to tinge the urine of a bright red colour, and what was poured off deposited a white sediment in greater quantity. On the eighteenth, the coagulum was nearly dissolved; so that the

coagulum immersed in the urine dissolved two days sooner than that in the water.

From this experiment we find, that it was the urine incorporated with the coagulum in *Experiment II.* that prevented the red globules from dissolving, and preserved the coagulum for so long a time, since these effects were not produced by urine while simply surrounding the coagulum.

If we compare *Experiment II.* with the result of the case, they agree so entirely, that it leaves no doubt of the process carried on in the bladder being similar to that which took place out of the body. The patient was unable to make water for twenty-four days, although the passages readily admitted, during the whole of that time, an uncommonly large instrument, which could not have been the case had there been any obstruction in them; for six days more he voided it with difficulty, but afterwards made water very well.

The coagulum out of the body was re-

duced in twenty-five days to the size of a cherry, and in four days more it was completely dissolved.

The patient's urine became darker, from the red globules mixing with it, in nine days. In the experiment this took place in five days.

The white sediment was first observed, in both instances, about the twelfth day; it continued to be deposited till the patient got well, and to the end of the experiment.

That the blood is capable of uniting with a quantity of urine equal to itself, so as to form a firm coagulum; that the red globules do not dissolve in a coagulum so formed; that an admixture of urine prevents the blood from becoming putrid; and that the coagulating lymph breaks down into parts almost resembling a soft powder, are facts which I believe to be new;—they may, however, have been before ascertained, although I have not been acquainted with them.

They are certainly not generally known,

and one object of the present paper is to communicate them to others.

These facts, considered abstractedly, may not appear of much importance; but when compared with what takes place in the living body, and found to agree with the process the blood undergoes in the urinary bladder, they become of no small value, since they enable us to account for the symptoms that occur in that disease, and lead to the most simple and effectual mode of relieving them.

CASE I.

Hæmorrhage from the Use of the Caustic.

A gentleman, forty-six years of age, who had been many years in the West Indies, had a stricture which brought on occasional attacks of irritation and discharge, that were treated as symptoms of gonorrhœa. In one of these he used an injection, and took large doses of the balsam copaiva; while under

this treatment he had a suppression of urine, and from that period, which was above two years before I saw him, he had frequent returns of strangury.

In 1796 he put himself under my care. Upon examining the canal, two strictures were met with, one at $3\frac{1}{2}$ inches, the other at $5\frac{1}{2}$. The caustic was used; one application relieved the first stricture, and three more allowed the bougie to go through the second, and pass on to the bladder. As the bougie met with no obstruction, nothing more could be done, and he went into the country. He continued well for three months, and then had a suppression of urine; but from the time he left town, the stream of urine had been gradually diminishing.

On examining the canal, it was found that the second stricture had returned, but readily gave way to the use of the caustic. A stricture was now discovered at seven inches not before met with. This at first could not be readily understood; but it appeared

that the removing of the first stricture had taken off the spasm from that next the bladder, so that the bougie was admitted to pass through it; but as soon as the parts were left to themselves it contracted again. This stricture, which was the original one, required fifteen applications of the caustic, before the bougie could pass through it; an hæmorrhage followed, which was so great that it rather lowered him. As the bougie did not pass with ease, the caustic was again applied; it gave a good deal of pain, but that soon went off. On the same night he walked home, about twelve o'clock, the thermometer standing below 30° , after having sat the whole evening in a hot room. This imprudence brought on a return of the bleeding, which continued several hours, and was followed by a suppression of urine. In the course of the day they both went off. He was very low and languid; nothing therefore was done for a week; a bougie was then passed, and went with ease into the bladder. Five

months after, the same bougie passed equally readily, and he continued free from any return of spasm. He then caught a gonorrhœa, which had the usual symptoms, but did not bring on any spasm or difficulty in making water, nor did it reproduce the stricture.

CASE II.

A gentleman, twenty-seven years of age, had a gonorrhœa four years and a half ago, unattended with violent pain or chordee; injections were used, but brought on no unpleasant symptoms; ever since that time he had a discharge, but no difficulty in making water. He put himself under my care in January, 1797. On examining the urethra it was discovered that he had a stricture at six inches from the orifice, which was removed by the caustic, and another at seven inches, which after three or four applications gave way. Immediately

after the bougie passed through, the parts bled a good deal. This I told him was of no consequence, and should it continue he was not to be alarmed, but to remain quiet. After going home, a distance of two miles, the bleeding returned, and was very profuse; it continued four hours, which alarmed him, and I was sent for. I found him faint and low, but the bleeding was nearly stopped. The quantity of blood lost he supposed to be several pounds; but I explained to him that the urine coagulated along with the blood; and as in these cases there is a frequent desire to make water, a good deal of urine is mixed with the blood, which in that state is all taken for blood. His alarm being in this way removed, he remained quiet, and had no more bleeding. Six days after, I passed a large sized bougie readily into the bladder; and at the end of seven weeks the same bougie passed with ease.

This gentleman caught a gonorrhœa four months after, which was severe; after

he got well, I passed the same bougie, that had been used before, with ease into the bladder.

CASE III.

A gentleman, forty-four years of age, had at different times slight symptoms of stricture, but not sufficient to call his attention to that subject; but in the year 1797, having a discharge for which it was difficult to account, he put himself under my care. A stricture was met with about six inches from the external orifice; this was treated by caustic; and from an anxiety to get into the country, after four applications it was used every day; this had been done twice when the first stricture gave way, attended by a bleeding, which lowered him a little, though in small quantity.

The caustic was now only used every other day. Another stricture was met with, and after the second application to it, which

was severe, he dined in company, and was afterwards dressing to go to a party, when an hæmorrhage came on at ten o'clock at night, nearly twelve hours after the application. It was very profuse, and lasted till four in the morning, which was six hours; and when it stopped a violent irritation came upon the bladder, with difficulty in making water, which only came away in the quantity of half an ounce at a time. This state of irritation was relieved by an opiate glyster, and he had several hours rest. His water was very much tinged with blood. In the evening the irritation returned, and was very severe; but by throwing up a glyster of warm water, and, after the bowels were emptied, an opiate glyster, this abated. On the second morning the frequency of making bloody water continued, and he voided at intervals small clots of blood, parts of them white upon the surface; this continued through the day. The greater number were discharged in making water at the time of going to stool,

On the third morning some more of these came away, after which the bladder was easy, the urine clear, and the times of making water as usual in health. He continued weak for a few days, but had no return of these symptoms; ten days after, when the parts had recovered themselves, the bougie was found to pass readily into the bladder, and there was neither discharge nor irritation in the parts.

In this case the blood had coagulated in the passage in small masses, and afterwards gone into the bladder, which kept up this irritation till it was all voided. The blood did not pass into the bladder in a fluid state; for in that case it would either not have coagulated at all, or formed one mass.

When the patient had perfectly recovered the effects of the bleeding, which was in fourteen days, a full sized bougie passed readily into the bladder, and he was entirely relieved from the symptoms he had felt before the caustic was used.

CASE IV.

A gentleman, aged twenty, very athletic and active, had a stricture about six inches from the orifice ; for which he had in vain used the bougie several months, and therefore had recourse to the caustic. The first application gave little pain ; but upon the second application, the pain at the moment was so severe as to bring on a cold sweat, and the soreness when he made water (which he did immediately after) was excruciating ; the second time he made water he fainted away with the pain. This went off next day, and he took a long walk ; before his return he felt blood trickling down ; but as I had told him bleeding was not of any consequence, he continued his walk, and afterwards went out to dinner. After drinking some wine, the bleeding increased so as to terrify him ; and he lost about three pints. Two surgeons who lived in the neighbourhood were called in ; and both

took the alarm, and begged I might be sent for. When I saw him, the parts were entirely covered with coagulated blood. I begged him to make water, and have the parts washed ; but no bleeding followed these exertions. I desired him to go to bed, and keep himself quiet, as I was under no apprehension, and expected no returns ; but if he should bleed, to encourage fainting : this he said he never had done, from loss of blood ; that once from the use of a bougie he had lost a great deal of blood, although nothing to compare with the present quantity, but no faintness was produced. He bled a little in the night, but next day it was completely stopped. He was extremely lowered by the loss of blood ; four days after, I introduced a full sized bougie, which readily passed into the bladder. He then went into the country. Three months after he called upon me ; said he had been living very hard, drinking two bottles of wine a day, had caught a gonorrhœa, and believed the stricture had returned ; but upon trial the

same bougie passed readily, and without pain, into the bladder.

CASE V.

A gentleman, of a florid complexion, stout and healthy, twenty-two years old, had a stricture, to which the caustic was applied ; it neither gave much pain nor produced the smallest irritation ; the stricture was about six inches from the external orifice. The third time the caustic was applied to the stricture he had more pain, and in half an hour got into a stage-coach, and travelled ten miles in a very hot day, a good deal crowded in the carriage. While he remained in the coach he felt a trickling of blood down his thighs ; and when he got out the bleeding increased so much as to alarm his friends, and at last he fainted away ; it was supposed that he lost above a quart of blood. I was sent for, but the bleeding was entirely stopped, and he looked very pale. I

allowed him to make water, which he was afraid to do lest it might bring on a return of the bleeding. I begged him to keep himself quiet for two or three days, and then return to town. There was no more bleeding, but a serous discharge which went off in three days; on the fifth day I passed a full sized bougie, which readily went into the bladder, nor did it give much pain in passing along the canal.

I have since had frequent opportunities of seeing him, and there has been no return of stricture in two years.

SECTION III.

STRANGURY SOMETIMES A SECONDARY
EFFECT.

It is not common for the caustic to produce stranguy, on the contrary, in many instances it removes it, by taking off spasmodic action from the stricture. It does however occur, that those patients who are subject to occasional suppressions from the use of the bougie, are not less so while the caustic is used, and sometimes have them in a still greater degree.

This symptom is more an effect of the passing the bougie along the canal while in a state of irritation, than of the caustic being applied to the stricture; and commonly comes on after one stricture has been removed, from the bougie passing over the surface where it had been. It also has in several instances taken place after the last

stricture has been destroyed, and the bougie passed through it into the bladder.

Although I consider the strangury in such instances as a secondary symptom, almost always the effect of some imprudence on the part of the patient, or some irritation brought on by passing the bougie over tender parts, I have thought it right to take it up as a separate subject, that I may not be misunderstood in what I have said upon the effects of caustic in removing strangury; and that this circumstance when it happens may not mislead the practitioner. It is generally on the days when the caustic is not employed that this symptom takes place. Sometimes after exercise, or retaining the water unusually long, it comes on the same day. Taking twenty drops of laudanum, remaining quiet, or passing a small bougie, will in general, either singly or combined, remove it.

The only instances I have met with in which it has been attended with any trouble, or been of long continuance, are subjoined.

CASE I.

A young man, from Lincolnshire, twenty-five years of age, had been subject to frequent attacks of strangury, which lasted for many hours, and were relieved by the warm bath, the internal use of opium, and glysters of warm water. Some of these were so violent as to endanger his life. He came to London in 1796, and put himself under my care. The caustic was applied to a stricture about three inches from the external orifice, which readily gave way; a second at $5\frac{1}{2}$ required four or five applications, and when removed brought on a strangury; this, after having continued four or five hours, was relieved by a glyster of hot water; the irritation upon the bladder however continued for two days. When this went off, and the canal was examined, another stricture was met with at $6\frac{1}{2}$ inches; the caustic was applied to this four times before it went into the bladder.

He was so circumstanced with respect to his private business, that the moment the strictures were removed, he went on the same day into the country. I had accounts of him six months after, and he continued perfectly well, having had no returns of irritation in the bladder or suppression of urine.

CASE II.

A gentleman, aged twenty-six, eleven years ago, had a severe gonorrhœa, which was treated by injection; the inflammation extended to the perinæum, with severe chordee, which was very slow in going off. From that time there is reason to believe he had a stricture beginning to form, which increased so as to require the occasional use of bougies for several years past.

In May, 1797, he put himself under my care, and a stricture was met with about six inches from the external orifice, which

readily gave way to two applications of the caustic, without his feeling much pain, although he had suffered very severely from a caustic applied to the skin of the arm, some years before; and the passing of the urine appeared to be improved. There was another stricture about $6\frac{3}{4}$ inches; when the caustic was applied to this he had a temporary spasm, which went off on passing a small bougie; a second application was made, after an interval of three days; this was followed by spasm in a greater degree. After the third application, which was on Monday, a spasm came on in the evening, and the bougie could not pass; he went into the warm bath on Tuesday forenoon, and in an hour after the bougie passed, and the urine flowed. On Tuesday evening at eight o'clock, he made some water, but did not empty the bladder; he passed a very restless night, the irritations being very frequent; the bougie could not now pass, and not a drop of water came. In the morning I attempted to pass the bougie

without success ; it went very readily down to the stricture at six inches, but no further. I then applied the caustic, and he took, at ten o'clock, thirty drops of tincture of opium, and had a glyster of warm water, without any benefit ; at twelve o'clock an opiate glyster was injected, which remained half an hour, and thirty drops of tincture of opium were given by the mouth. At four he took forty drops of tincture of opium, at six used the tepid bath ; then went to bed, and sweated profusely. At ten o'clock he passed a tea-spoonful of water, and was easier ; a bougie was introduced down to the stricture, and was followed by a table-spoonful of water ; this relieved the bladder. He took camphor, five grains ; from this time till four in the morning he had a straining every seven minutes, and half an ounce of water flowed at each effort ; but at four, the strangury became complete. He now fomented the perinæum with spirits and vinegar for twenty minutes, after which the urine passed in drops. At five,

bathed his feet, and passed a bougie down to the stricture, which was followed by a quarter of a pint of urine. He now passed the bougie after every irritation, and brought away about the same quantity of water. At twelve, the urine came without the use of the bougie, and continued to do so through the day. During the whole of the time that there was a complete strangury, which was twenty-four hours, it was unattended by fever or violent agitation, and in the intervals he was perfectly composed.

This attack of spasm had been brought on each time, by using too much exercise after the caustic had been applied ; and it appears that the spasm was on the stricture at six inches, probably brought on by the irritation of the bougie passing through it, before the parts had recovered themselves.

The caustic was applied at the end of ten days, and he had a connection the same night, which appeared to sooth and quiet the parts ; but unluckily he repeated the

experiment before morning: this brought on a return of the spasm, which lasted for twenty-four hours, without his being able to pass a drop of water, and then went gradually off.

He was afterwards more prudent, and had no return of spasm, although the caustic was applied twelve times before; this stricture was completely destroyed.

CASE III.

A French gentleman, aged fifty, had long been troubled with a difficulty in making water. Six years ago he was reduced to the dreadful situation of being separated from all his family. In August, 1795, he came from Germany to England, and arrived in November. Before he left Germany, he had a great discharge of matter from the urethra; but the fatigue of his journey, and a voyage of fifty-two days in a ship, with bad accommodations and

coarse provisions, brought on a slight inflammation of the bladder.

For these complaints he took various medicines, during five months, without benefit, and in June he consulted me. At that time the symptoms increased, he made water with great pain, in a small stream, and had a discharge from the urethra.

Upon examination, the complaint proved to be stricture in the urethra. The treatment by caustic was adopted, and after sixteen applications two different strictures were removed, and he appeared to be materially relieved.

When the bougie went through the strictures and passed on to the bladder, it gave a good deal of uneasiness; this was followed by pain in the region of the bladder, and frequent desire to make water. He told me next day that he had made water thirty times in the night. Under these circumstances I directed him first to take opening medicines, then camphor and opium internally, and opiate glysters; but

they afforded no relief, and the symptoms increased under this treatment. After this had gone on for four days, I was led to feel the bladder externally, and found it to be very much distended: I immediately passed a flexible gum catheter, which readily went into the bladder, and drew off three pints of water. This led to an explanation of the quantity he had voided in the day; and the thirty times he before mentioned to me, were only efforts that had been ineffectual, which, from being a foreigner, he had not well explained, and called it making water. From this error, the strangury brought on by the bougie passing over the recently removed stricture, had been allowed to continue four days undiscovered, and brought on a paralysis of the bladder, attended with inflammation of its internal membrane. When his water was drawn off he had pain, and the last drops were followed by a discharge of matter. The bladder was emptied once in twenty-four hours; but this, after two days, was found

not to be sufficient, and it was repeated every six hours. Under this treatment, the pain abated, the quantity of matter became less, and in three weeks he was free from any uneasiness, and made water without the instrument.

SECTION IV.

AGUE.

THAT the application of the caustic to a stricture should bring on a regular paroxysm of fever, is an effect that could not be expected, and one for which it may appear difficult to account. It is most frequent in patients who have been long in hot climates, and has in general been occasionally a symptom of the disease in its early stages, when the patient was under the influence of any temporary indisposition. I have, however, met with this symptom in patients who were never out of England, and had no recollection of having before experienced it.

The paroxysm of fever seems to arise from the stomach sympathizing with the stricture, and purgative medicines are the most effectual means in carrying it off. I have

never had occasion to have recourse to any other treatment. I have in no instance seen any serious consequences arise from these attacks, although in several cases they have been very violent. In general they come on when a stricture is destroyed; being found to occur less frequently at any other time.

The instances in which this symptom has appeared have been very numerous: the following cases were the only ones in which it was very severe.

CASE I.

A gentleman, aged fifty-four, twelve years ago, had symptoms of stricture, having a difficulty in passing his water, which was relieved by the introduction of the bougie; there was no other symptom, neither discharge from the canal, nor local uneasiness at any other time. These attacks were not frequent, they only came on from occa-

sional colds, and were readily relieved by the use of the bougie. For the last two years they had become more frequent and more severe, and his colds upon exposure to damps brought on aguish attacks; the strangury was relieved by applications of hot flannels to the perinæum, and tincture of opium taken internally; but once he remained four hours in the tepid bath before the strangury went off. In March, 1797, he put himself under my care; the caustic was applied to a stricture which was $4\frac{1}{2}$ inches from the orifice, this gave way to two applications; there was another at six inches, which was removed by four applications, but when it gave way an ague came on in the evening, and there was a return next day; it then went off. A third stricture at seven inches required three applications; but it never gave the same pain, or produced constitutional affections, as the other had done. As soon as this was removed all the parts were at ease, and the bladder recovered its natural state.

CASE II.

A gentleman, twenty-eight years of age, a native of Jamaica, had lived in that island until he attained the age of nineteen, in the enjoyment of tolerable health. At this time he was afflicted with a violent gonorrhoea, which continued on him for about six months, and then disappeared without his having taken any medicine, or going through any sort of cure whatever. He then went to Spain, and lived in the southern parts of that kingdom for the term of nine years, without visiting any colder country.

For two years before he left Spain he was afflicted with successive venereal complaints, from which his imprudence never allowed him time to be relieved, and which at length brought on stricture. He was then recommended to come to this country, and undergo a course of bougies.

On his arrival he put himself under my care. Upon examining the canal, a stricture was met with at $5\frac{1}{2}$ inches from the office; to this the caustic was applied.

On the third application this stricture was destroyed; but in half an hour he was seized with a violent shivering, attended with a severe fever. These fits not only returned on every succeeding application, but also when he exposed himself to cold, or underwent any bodily exertion. He was so much reduced by them, that it was thought expedient to suspend for a while the process of his cure.

About three weeks were allowed him to recover his strength, which he did tolerably well before the recommencement of the process.

On returning to the use of the caustic, sometimes after the application there was a tendency to shiver, which manifested itself on cold days; but went off on going immediately to bed, and getting into a perspiration. He was then desired to stay in

the house ; and by this precaution was relieved from these attacks. One day he was tempted to go to a coffee-house, an hundred yards from his lodgings, and in an hour after being there, a shivering fit came on ; this induced him to give up going out till he was quite well.

The use of the caustic was continued for four months, three times a week. In all about seventy applications.

There was an irregularity in the canal, which did not allow the bougie to pass readily into the bladder ; but a flexible gum catheter was then made use of, with a stilet to give it firmness ; this was used three times, with the interval of a fortnight at each time, and was passed without any difficulty into the bladder.

This gentleman afterwards went to Jamaica ; he had no return of his complaint while he remained in this country. It is remarkable, that a brother of this patient had the same disease, which was removed by the caustic ; but there was not the least dispo-

sition to paroxysms of fever. This led me to inquire what difference there had been in their mode of life; and I found that this latter gentleman had left Jamaica at five years old, and remained in England for many years, so that his constitution was naturally less irritable than that of his brother.

CASE III.

A gentleman from Holland, thirty-five years of age, a native of that country, who had been subject to agues, and at those times to suppressions of urine, for several years, consulted me on account of a difficulty in passing his urine. The canal was uncommonly small, and a stricture was met with at the distance of $3\frac{1}{2}$ inches from the orifice; this had the caustic applied to it three times, after which the bougie passed through it. He was then taken ill with a severe ague, which he attributed to having

taken cold. This went off with a very copious perspiration. Another stricture was met with at $5\frac{1}{2}$ inches ; soon after the application of the caustic an attack of ague, more severe than the last, came on ; when this went off, it was in eight hours succeeded by a slighter attack, which left him very weak : in neither of these attacks was there any suppression of urine, and the only medicine given was a draught, composed of infusion and tincture of senna, with soluble tartar.

There was still another stricture at $6\frac{1}{2}$ inches, which required several applications of the caustic, and when this was destroyed an attack of ague, more severe than the others, was brought on, and did not terminate as they had done ; it was attended with delirium, which lasted twenty-four hours, and for several days the fever, in some degree, continued ; but upon his getting out into the air it went off. After his recovery the bougie was found to pass into the bladder, and he made water with more ease than he

had done for many years. His business called him over to Holland, as soon as the cure was completed.

CASE IV.

A gentleman, aged fifty-one, who had lived thirty years in the West Indies, had for two years, at short intervals, attacks of ague, and during these attacks, difficulty in making water, and in some of them a total suppression; he came to England in 1796, at which time I was consulted. Upon inquiring into the nature of the difficulty in making water, it was discovered that he had several strictures, the first of which was within three inches of the external orifice. To this the caustic was applied, which gave no pain; indeed he was scarcely sensible of the application. He had a fit of ague the day before, and another the following day; but the caustic being applied a second time, there was no return of the

ague. It was applied to a second stricture at six inches, and after seven applications the bougie passed into the bladder. He had the next day an attack of fever without the cold fit, and a swelling in perinæo, extending towards the anus. This abated in twenty-four hours, and in three days went off. Upon passing the bougie, at this period, it stopped at a stricture at seven inches, which had been relaxed by the destruction of the one next to it, but not destroyed ; this required seven or eight applications of the caustic, the effects of which brought on severe attacks of ague : at last it was subdued, and the full-sized bougie went into the bladder. After the last application of the caustic, which made the stricture give way, he was attacked with a rigor, which was not followed by a complete sweating fit ; next day the cold fit returned, and the fever was extremely violent, the sweat uncommonly profuse, and when it went off left him in a very languid state ; he was several hours with-

out any perceptible pulse, although able to speak and take nourishment ; but this gradually went off. It was a fortnight before he recovered his strength.

The stricture was now found to be destroyed, and six months afterwards I passed a bougie; so that it had not returned.

CHAPTER VII.

OF THE TREATMENT OF STRICTURES IN THE
ŒSOPHAGUS.

THE Œsophagus, as it is required to be wider at one time, and narrower at another, to adapt it to the different kinds of food that are necessarily conveyed into the stomach, is nearly under the same circumstance, with respect to the formation of stricture, as the canal of the urethra.

Cases of stricture in this canal are for very obvious reasons much less frequent than in the urethra; they are, however, more common than they are generally supposed to be, and the symptoms they produce are even more distressing and more dangerous than those of which I have treated in the former part of this work.

To convey to the reader a distinct idea of the disease, for which I mean to propose

a new mode of relief, I cannot do better than to state those facts on which my own knowledge of it is founded ; these will be met with in the histories and dissections of the two following cases, which came under my care before I had applied my mind to the consideration of strictures, or had learnt the effects of the caustic in the treatment of that disease in the urethra.

A lady, about thirty-six years of age, and naturally healthy, had no difficulty in swallowing till a twelvemonth before her death ; at that period this complaint first came on, and gradually increased, which alarmed her exceedingly, and made her apply for medical advice. She was directed to take the cicuta to a considerable extent. Mercury was used, and a salivation kept up for some time, but without the least benefit. In consequence of the effects of the mercury, there appeared to be an enlargement of the thyroide gland, and the lymphatic glands in its vicinity, which

continued in an enlarged state till her death.

Ten months after the commencement of this complaint I first saw her ; this was in December, 1789 ; the *œsophagus* did not admit at that time any solid food to pass down, and even fluids passed with great difficulty, and in very small quantity, attended with considerable pain, which was continued along the fauces to the basis of the skull, and through the eustachian tube to the ear. This pain returned at intervals when no attempt was made to swallow, and lasted for about an hour ; the periods of its return were irregular, and no cause of their recurrence could be ascertained. For some months she had little or no thirst, although formerly she was as much liable to it as people commonly are ; this circumstance, a very fortunate one, might arise from the saliva not escaping from the mouth and fauces by passing down the *œsophagus*.

A long bougie, about the size of a goose's quill, was passed into the fauces, but did

not go beyond the cricoide cartilage; one with a very small point passed considerably lower down in the Œsophagus, and when withdrawn was covered with a thick mucus; this appeared to ease the throat at the time, but brought on so much irritation afterwards, as to prevent its use being again had recourse to. Tincture of opium was now given upon sugar, but did not relieve the irritation, which was worse at night; it was then tried in glysters, but with no better effect, and produced headaches.

As the Œsophagus hardly admitted nourishment in a fluid state to pass in sufficient quantity to support the body, attempts to give medicines by the mouth were entirely relinquished, and they were in future exhibited in form of glyster.

Jan. 12th, 1790; fifteen grains of musk were thrown up three times a day, which seemed rather to soothe and lessen the irritability and general uneasiness, but not in the least to relieve the swallowing. This

was continued till the 18th, when it was left off, as it appeared to have lost its effect.

Jan. 18th, a glyster of twenty grains of the extract of hemlock was thrown up three times a day; it brought on giddiness, but did not affect the disease.

Jan. 19th, it was repeated, with only ten grains in each glyster, and then left off.

Jan. 21st, four ounces of decoction of valerian, and one dram of the powder, were thrown up the rectum, and the throat fumigated with factitious cinnabar. The valerian glysters were repeated three times a day, for three days, without benefit; the fumigation seemed to give temporary relief to the throat, and she thought that she swallowed rather better after it; although upon the whole she certainly became daily worse.

Jan. 25th, the use of the valerian was continued, with fifteen grains of camphor, three times a day; this certainly gave more ease than the other medicines. The camphor was

employed for three days, but her throat became now so much oppressed with phlegm, that she was obliged to clear it frequently to prevent being choked ; and as the camphor gave a disposition to sleep, which prevented the phlegm collected in the Œsophagus from being brought up, and gave her violent head-aches, she was induced to leave it off.

Jan. 31st, at bed-time two scruples of Dover's powder were thrown up, in consequence of a cough, and heat upon the skin, and some degree of fever ; they had similar effects as when given by the mouth, brought on perspiration, and gave considerable ease both to the pain and cough, and procured a good deal of sleep. This was repeated on the 2d, 4th, 5th, and 7th of February, and produced the same effect, viz. perspiration and sleep.

Her throat became more and more oppressed with the phlegm, till at last she could not clear it at all ; for six days she could not swallow any thing, and was en-

tirely supported by nourishing glysters ; on the ninth of February she died.

Upon examination of the parts after death, the disease appeared to be confined to the coats of the œsophagus, just behind the thyroide cartilage ; at that part they were so much contracted as nearly to obliterate the passage ; about half an inch lower down, there were two spots, like ulcerations, just beginning to take place.

The thyroide gland, and the lymphatic glands in the surrounding parts, were hard and swelled, but seemed not to have in the least obstructed deglutition.

At the time of her death, the muscles of the neck were all rigid from spasmodic contraction.

A lady, fifty-nine years of age, had been remarked from her infancy for having a very narrow swallow, but at that time it could not be considered a disease ; it increased as she grew up, and for the last thirteen years of her life was very troublesome ; but

even before that period she was unable to swallow any substance the size of a pill, and was obliged to masticate her food thoroughly, and swallow it with great caution; for when she swallowed in a hurry, or was off her guard, it brought on a spasm upon the œsophagus, and she had the sensation of being choked; this effect was more readily produced when her mind was at all agitated, and at the periods of menstruation. These affections or spasms were relieved at different times by rubbing the throat externally behind the cartilages of the larynx, by smelling eau de luce, and swallowing a few drops of tincture of opium, which passed down to the stricture, remained there, and removed the spasm. These attacks lasted sometimes only a few minutes, at others thirty-six hours; they went off always in an instant, and communicated the sensation of something giving way; they appeared to herself to be brought on by the wind from the stomach opposing and stopping the morsel, and the removal ap-

peared to take place from the wind escaping, and permitting the morsel to pass.

Thirteen years before her death, she had a considerable uterine hæmorrhage, which lowered her very much, and from that time this complaint in her swallowing became evidently worse; the returns of these affections were more frequent and more violent, and when free from them, the passage of the œsophagus was permanently contracted in a greater degree than before; when the attacks of choking came on, the opium and volatile salts were now of no use. She could swallow very little solid food, not being able to give passage to any thing larger than a pin's head.

Eight months before her death, she was seized all at once with a fixed pain a little above the pit of the stomach under the breast bone, and a coldness in the stomach, with chills down her back; this went off gradually, but returned in a month much in the same way, and never afterwards could be said to have gone away altogether.

At this time the disposition to choking seemed to be diminished, the morsel passed down some way without much pain, but when it was dropping into the stomach, she was thrown into agony from the pain ; it was very acute and greatest at the first attempt, but less severe upon repetition ; this lasted about a fortnight, when it gradually abated : during this period, and for the remainder of her life, she was unable to attempt swallowing solid food. Besides the fixed pain in the stomach, she had for some time after the sensation of an acid in the stomach, and violent retchings ; these symptoms gradually and uniformly increased, and for the last six weeks she had an increase of the secretion of saliva, spitting about a quart a day ; this produced retching, and what came up from the stomach gave her the sensation of being very hot in the mouth : latterly she brought up a brown coloured fluid, like the broken coagulum of blood ; this came after retching. Sometimes when she attempted to swallow nou-

ishment, it appeared to pass down to the orifice of the stomach, and then returned with some of this fluid, which looked like coffee grounds.

A little time before death, the debility and merasmus was extreme; there was a considerable difficulty in breathing; she had likewise, for the last month, an appearance of aphthæ in the mouth, which before death spread over all the fauces and tongue: worn out by these symptoms, and want of nourishment, she died.

Upon examining the body after death, there appeared to be no disease in the stomach itself.

The inside of the mouth was covered with aphthæ, which did not reach beyond the fauces. The œsophagus, directly behind the first ring of the trachea, was so much contracted that the orifice did not admit a common quill. At this part there was no apparent disease, the parts were in no respect thickened, and the internal membrane had the natural appearance, only contracted,

forming a regular annular stricture. For about an inch lower down, the œsophagus was externally as small as common in the greatest degree of contraction; after which it became a little larger, although still much smaller than we generally find it. The coats at this part were thinner and less muscular than natural. The whole internal surface of the œsophagus, below the bifurcation of the trachea, was, for three inches in length, in a state of ulceration, and the parts surrounding it at this part, were all consolidated; this ulcer had two sinuses extending some way into the lungs, but these did not appear to communicate with the air cells; the aorta at this part adhered to the œsophagus, but was not itself at all affected by the disease.

The symptoms of stricture resembled those of the same disease in the urethra; ulceration seemed to have begun only eight months before death, as the pain from food passing into the stomach came on at that time, which seems to fix the period

of the inflammation that necessarily preceded the formation of the ulcer.

It does not at first sight appear in what way the stricture in the upper part of the œsophagus should produce ulceration in that canal nearer the stomach ; and yet this effect resembles so exactly what is met with in strictures in the urethra, ulceration taking place behind the stricture, that it is difficult to suppose the ulceration in the œsophagus unconnected with the stricture. It is probable that in such cases the frequent retching arising from the phlegm collected between the stricture and the stomach, produces the same consequences as the ineffectual straining of the bladder, to get rid of the urine.

The examination of these two cases afforded me an opportunity of ascertaining, that obstructions in the œsophagus are similar to those in the urethra. Since that time I have been naturally led to consider this disease in the canal of the œsophagus, and of the urethra to be the same ; and that

any observations which I made in the treatment of the one, were applicable to the other.

Whenever I have been consulted in cases of stricture of the œsophagus, I have had recourse to the use of the bougie ; and if that mode of treatment failed, I have proposed the application of the caustic. In some instances the use of the bougie has answered, in others it has failed, as will appear from the following cases.

CASE I.

A woman, about twenty-five years of age, of an irritable habit, but in very good health, came over from Ireland in the packet ; the motion of the vessel made her extremely sea-sick, and she retched for several hours ; the effects of the retching were a difficulty of swallowing, and tenderness in the whole canal of the œsophagus. The difficulty in swallowing increased, and

in some months after was so great, that I was consulted about the best mode of relieving it. I passed a bougie, the point of which was nearly the size of the little finger, becoming gradually larger towards the other end; this, with some difficulty went into the stomach, and the next day she swallowed much better. As the stricture, from this examination, proved to be principally spasmodic, I advised her occasionally to have a bougie passed; not considering the obstruction sufficient to make the use of the caustic either proper or necessary; and I understand that by following this mode of treatment she has been very much relieved.

CASE II.

A gentleman, twenty-six years of age, had from his infancy an occasional difficulty in swallowing; this increased as he grew up, and has been at times very distress-

ing, rendering him unable to get even fluids into the stomach without much uneasiness, and then in very small quantities at a time.

These attacks came on without any previous cause that could be ascertained ; and lasted a few days, after which they gradually abated ; but even in the intervals he could only swallow very small morsels of solid food.

This gentleman was very subject to the gout, and had several severe fits of it in his feet ; but there did not appear to be the smallest change at these times in the complaint in the Œsophagus. He had tried a great many different medicines of the nervous and spasmodic kind, without the least advantage. An emetic once seemed to relieve him, but at another time did the very reverse ; so that it was never afterwards had recourse to.

It is curious, that whenever he was made sick, by drinking too much bad Port wine, so as to retch severely, he was relieved for several weeks. When I was first consulted,

I was desirous of ascertaining whether the stricture was only spasmodic or permanent, and therefore passed a bougie of the size of the finger, which met with no obstruction, and went readily into the stomach. It became evident, from this circumstance, that there was no permanent stricture, at least none sufficient to authorize the use of the caustic. I therefore proposed to try the effects of mercury, which had not been used. He went through a course of mercurial frictions; during this course he derived no immediate benefit from it; but I understand that ever since the effects of the salivation abated, he has been much better than he was before.

CASE III.

A gentleman, aged forty-three, of a very irritable habit, extremely nervous, and readily agitated by casual occurrences, in March, 1796, had for the first time a difficulty in swallowing, which increased gra-

dually, and was attended with symptoms of great irritation; as quick pulse, hot skin, fits of choking, sickness, and bringing up great quantities of mucus from the stomach. In this state the bougie was had recourse to; and although the point of the bougie passed through the stricture, it rather increased the irritation. Its use was persevered in for six weeks; but the complaint became so much worse in that time, as to raise apprehensions respecting the patient's life. Under these circumstances he came to London in June, 1796, attended by his surgeon, to see what chance there was of the use of the caustic affording relief.

At the time I saw him he was in a state of great irritation, with a quick pulse, hot skin, great hurry of spirits, almost approaching delirium; his voice not reaching much beyond a whisper, a great degree of impatience in his temper; and any attempt to swallow attended with convulsive spasms in his throat, and at those times a great deal of phlegm was discharged. The

stricture was situated nearly behind the middle of the thyroide cartilage; it did not admit the end of a bougie, the diameter of which was five-twentieths of an inch. As he could not live in his present state, all risk was out of the question, and the only thing to be considered was, whether there was a chance of relief from the caustic. I did not hesitate in giving a decided opinion, that the caustic was not likely to aggravate the present symptoms, and that it was highly probable it might remove the obstruction. From these assurances, the patient very willingly submitted to its being tried.

The caustic was applied by means of a bougie, in the same manner as to a stricture in the urethra. The common bougie was passed down to the obstruction, and while there, the part opposite the cutting edge of the front teeth of the upper jaw was marked, to determine the exact distance of the stricture; this bougie was then withdrawn, and the curve it had taken care-

fully preserved. The same curve was given to the armed bougie, upon which the exact distance was marked ; it was then introduced, and the caustic allowed to rest for about half a minute against the obstruction : it gave little or no pain, brought on no local inflammation, and in the course of the day there was less spasmodic affection of the œsophagus when he attempted to swallow. This gave encouragement to repeat the use of the caustic, and it was applied four times, once every other day, each application gave evident relief.

After the fourth application he could swallow fluids without any difficulty, and could get down morsels of meat with more ease than he had done since the beginning of his illness. The armed bougie did not pass through the stricture, there was therefore no reason to believe that it was wholly destroyed ; but the confinement to the house in London, in addition to the effects of the caustic brought on a fever, which made it necessary to discontinue the use of

the caustic ; the fever went off in a week, and he swallowed with little difficulty, had less phlegm collected in the œsophagus, and his voice was more distinct. It was thought right to attend to his general health, and with that view he went immediately into the country, where he recovered strength, and was able to walk two miles without fatigue. He went to the sea in the autumn, in which situation his health was still more improved. He did not attempt bathing.

He returned to London in March, 1797. He had not lost any ground respecting his swallowing since the caustic was used, his voice was more distinct than last year, his fits of choking less frequent, and the quantity of phlegm collected in the œsophagus not so great as before, although he was still sometimes liable to it.

It is remarkable, that whenever he was sick and retched to vomit, there was no difficulty in bringing up the contents of the stomach, that action relaxing the stricture.

With a view of relieving his complaint still further, which it was not thought prudent to attempt in the state of irritation that he was in the year before, the caustic was again applied. I now ventured to employ the lunar caustic of the full size, in which the sticks are cast for the common purposes in surgery, which is more than double the size of that I had formerly used, the bougie was of necessity also much larger. The caustic was first applied on March 18th, it gave no violent pain; but the sensation produced by it remained for half an hour and then went off. On the 22d it was repeated; he had caught a cold, which at that time was very general in London; this increased the quantity of phlegm formed in his mouth and throat, but did not prevent us from prosecuting the use of the caustic. The 24th the armed bougie passed through the stricture, and immediately some thick phlegm was brought up, which appeared to have been lodged in that part of the œsophagus. 25th, he swallowed considerably

better, and his voice was distinctly louder than common ; this was evident to all his friends. 26th, the application of the caustic was repeated, and the armed bougie again went through the stricture. Having gained so much, I did not think it prudent to attempt further enlargement till it should be ascertained, after leaving the parts some time to themselves, that it was absolutely necessary ; and he went into the country, London not agreeing with his general health, and his cold being rather increased. I have since heard, at several different times, that he continues better than he was at the time he left town, and swallows very comfortably.

CASE IV.

A gentleman, aged fifty-four, for twelve years felt occasionally a pain in his stomach, and in the last two years of that period the returns became more frequent,

attended with violent retching, without bringing off any thing from his stomach but phlegm. In November, 1795, after a very severe attack of this kind, he found a difficulty in swallowing morsels of the usual size; this increased so much, that in March, 1796, he was unable to swallow meat. In June the difficulty was so alarming as to require medical assistance. On the 20th of June, a bougie smaller at the end than the point of the little finger, was passed into the œsophagus; it met an obstruction behind the cartilages of the larynx, but was pushed beyond this tight part. It was passed regularly for thirty-two days, but did not produce the smallest improvement in the act of swallowing. On July 18th, he put himself under my care; at that time he could swallow liquids a little at a time, but even this required caution; bread and butter, and sopped bread, were often got down with more ease than liquids. He swallowed better at one time than at another, and could tell from his feelings,

without making the attempt, whether he could swallow better or not. He was subject to occasional fits of irritation, and at these times brought up a great deal of mucus and phlegm. As the bougie had failed, I proposed the use of the caustic, to which he readily consented. The curve from the mouth to the œsophagus was ascertained by passing a bougie of a large size down to the stricture; an armed bougie was then moulded into the shape in which the other came out; it was passed down to the stricture, and allowed to remain there some seconds; it gave no pain, brought on no irritation, and he swallowed some water immediately afterwards with more ease than usual; next day he eat one morsel of roasted veal without difficulty. 20th, the caustic was again applied for half a minute; the pressure made use of gave pain. He swallowed some water immediately after, and got down two gulps at once, which he remarked he had been unable to do before. 21st, he eat a small piece of mutton, and thought he

swallowed better; 22d, the caustic was applied for a still longer time; he drank some water, which readily passed the stricture, but stopped somewhere near the stomach, before it went into that viscus; 24th, the caustic was repeated and gave less uneasiness; 27th, the armed bougie passed through the stricture, to which it had now been applied five times. August 1st, he swallowed tolerably well, but the food met with an obstruction near the stomach, which was now so much increased, that the morsel was forced up again.

I attempted to pass a long bougie down to this obstruction near the stomach, but it was too large to go through the first stricture; 3d, the caustic was therefore again applied to the first stricture; when he swallowed gently, the morsel got into the stomach, but any hurry brought on spasm near the cardia, which made him retch and bring it up again: 4th, this stoppage at the orifice of the stomach had been so great, as to prevent any thing getting into the

stomach, although it readily passed down to that part.

This led me to believe that there was a disease near the orifice of the stomach, of which the stricture in the *oesophagus* was only a consequence, similar to what happens in the urethra. A stricture near the neck of the bladder, producing a contraction in other parts of the canal.

As this disease, of whatever kind it might be, was out of the reach of surgery, I desired the assistance of a physician, and Dr. Pitcairn was called in.

It was proposed that a blister should be applied to the pit of the stomach, and that the patient should go through a course of mercurial frictions, using nutritious broth clysters. For two or three days he could not swallow at all; on the ninth, some food passed into the stomach, but it could not be retained there. 12th, he was able to retain twelve ounces of asses milk, given in small quantities through the day; his pulse was more regular, but very weak. While

the gums were sore from the mercury, he thought he swallowed better, and worse when the effects of the mercury went off.

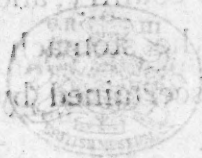
September 1st, he grew weaker; the use of the mercury was therefore left off. He now retained scarcely any thing upon his stomach, and that principally wine; he brought up occasionally a great deal of mucus mixed with matter.

On the fifth of September he died. This happened in the country, and the nature of the disease in the stomach was not permitted to be ascertained by an examination after death.

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On the 11th of September he died. This happened in the country, and the nature of the disease in the country was not permitted to be ascertained by an examination after death.



EXPLANATION
OF
THE PLATES.

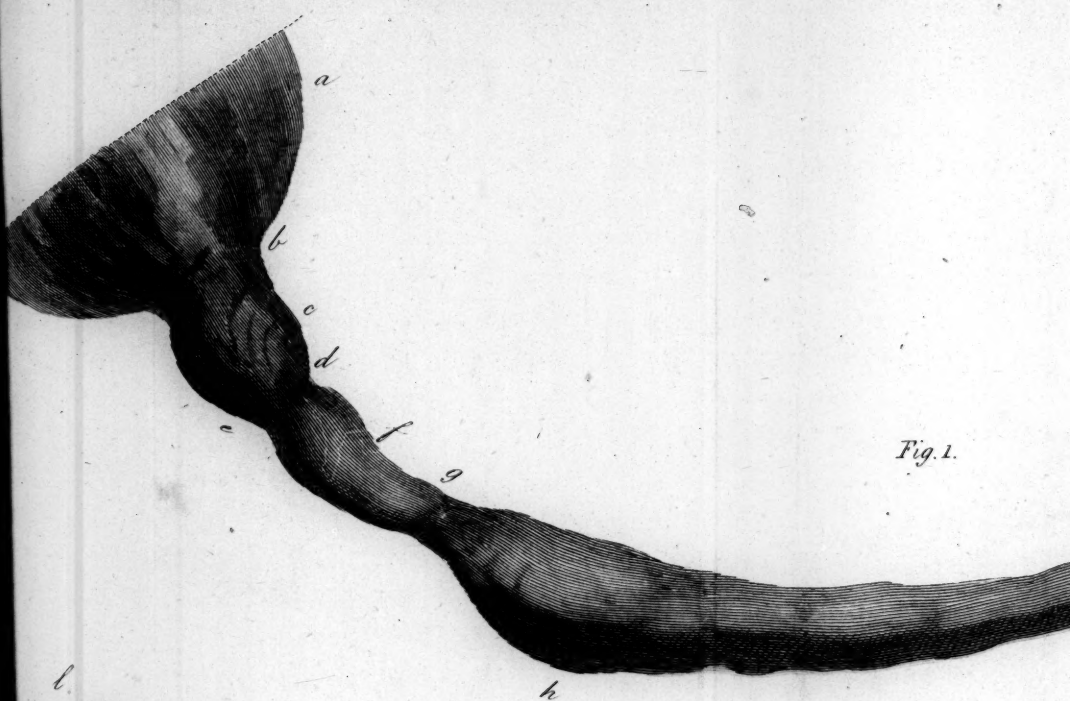
IT appears essentially necessary for the proper management of strictures, that the surgeon should be perfectly acquainted with the natural form of the canal of the urethra; its shape, size, the course it follows, the particular situation of the bulb of the urethra, and of the prostate gland. Not having seen any engravings by which all these circumstances are accurately illustrated, I have been induced to lay before the public the two following Plates.

P L A T E I.

This Plate represents two casts of the urethra, which were made by injecting that canal in two different subjects with wax, and afterwards removing the wax by cutting open the urethra; so that they form bougies of the exact size of the canal, impressed with all its natural inequalities.

Fig. 1. This cast, which was taken from a subject about seventy-five years of age, is represented in the engraving of its exact size. The dimensions of the different parts are accurately given in the third Section of the first Chapter of the work, so that it is not necessary to repeat them here. I have made similar casts from the urethra of subjects at different ages, but the general appearances resemble those represented in this figure.

- a*, A portion of the bladder.
- b*, The neck of the bladder.
- c*, The canal which passes over the prostate gland, and extends from *b* to *d*.
- e*, The caput gallinaginis, where the seminal ducts open, imprinted upon the wax, and a ridge leading from it, along the sides of which the semen passes forwards towards the reservoir formed for that purpose, which is called the bulb of the urethra.
- f*, The membranous portion of the urethra.
- g*, A natural constriction of the urethra, directly behind the bulb, which is probably formed with a power of contraction, to prevent by its action any part of the semen from passing back when the acceleratores muscles, in the orgasm, propel it into the vagina.



Will^{ms} Clift Del.



W^m Skelton Sculp^t

- b*, The bulb of the urethra, or reservoir, where the semen is collected previous to its expulsion.
- i*, A portion of the canal which appears to be narrower than the rest, and nearly of the same size as the constricted part at *g*.
- h*, A natural enlargement of the canal, three-fourths of an inch from the external orifice.
- l*, The external orifice, which in some instances is smaller than the rest of the canal, but in others is of the same size.

Fig. 2. Is the representation of a cast taken from the urethra of a man thirty years of age, the dimensions of which have been also given in the third Section of the first Chapter. As this cast is similar to the last, the same explanation may be applied to its different parts. The express purpose for which it is here represented, is to shew the part at *g*, which in the former figure was in a natural state, but in this had formed a stricture; and the impression made by the stricture gives a better idea of the effect that disease produces on the canal than can be formed even from a representation of the morbid parts themselves. It also shews the situation in which this disease is most commonly met with; and if it be true that this part is naturally employed to shut up the canal on particular occasions, it satisfactorily explains why it should be the most liable to this disease.

It is a strong circumstance in favour of the supposition that this part is so employed, that a number of patients who have irritable urethras, or strictures in that situation, find the part so much affected by having connection with women, that if it takes place more than once in the night, a spasmodic affection is brought on, inducing stranguery.

P L A T E II.

This Plate represents a cast of the urethra and bladder, in which is seen the exact curve of the urethra, from the part where it is a fixed canal, to its termination in the bladder.

aa, The cast of a portion of the bladder in its distended state.

bb, The ureter of the right side terminating in the bladder.

c, The cast of the canal which passes over the prostate gland.

d, The membranous portion of the urethra.

e, The bulb of the urethra.

ff, The canal of the urethra leading to the external orifice, in the same situation respecting the bladder, in which it is placed when the penis is in an erected state.

Plate 2.



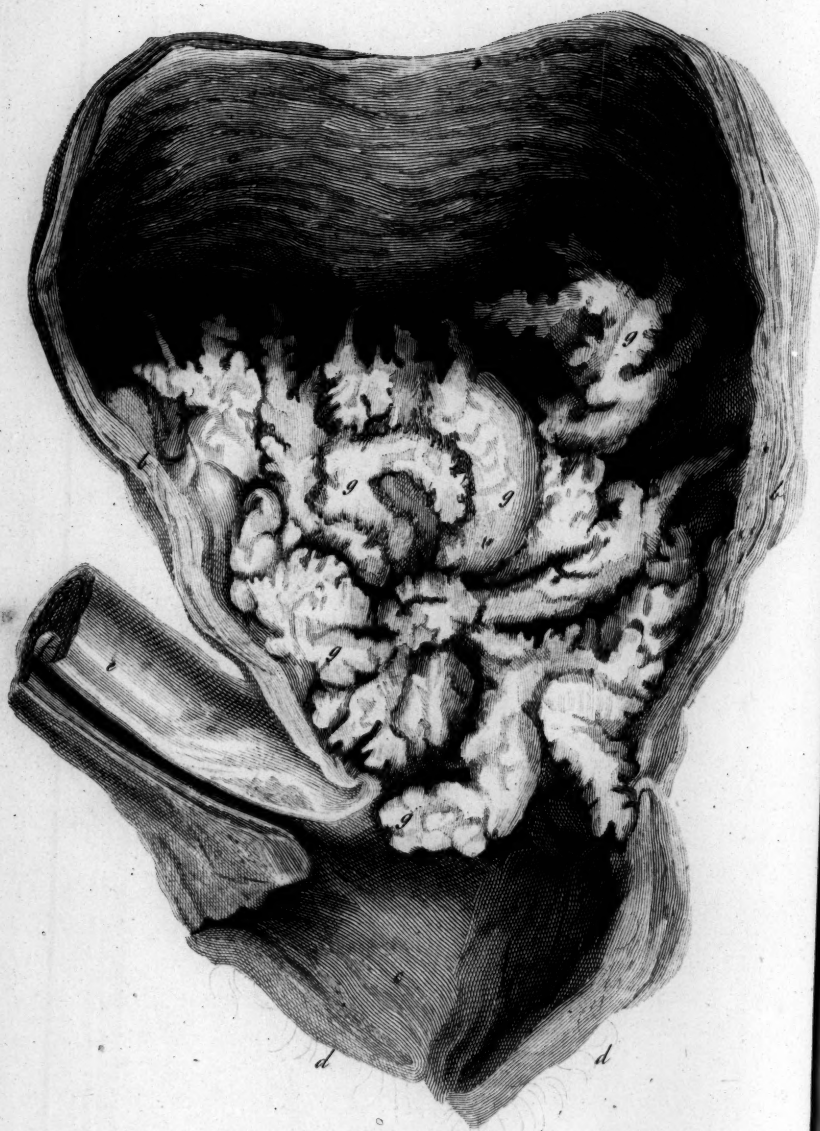
Will^m Clift Del.

Will^m Skelton Sculp^t





Plate 3.



Will^m Clift Del.

Will^m Skelton Sc

P L A T E III.

Is a representation of the cavity of the bladder of a patient who had a stone which adhered to its internal membrane. The particulars of the case and dissection are related at length in the third Section of the fifth Chapter, to which the reader is referred.

The patient had undergone the operation for the stone, and the wound was not healed up at the time of his death; it was therefore considered as the best mode of opening the bladder to do it laterally, by an incision from the opening made in the operation, towards the fundus of the bladder.

In this way the cavity of the bladder was exposed, without any portion of its coats being removed; and neither the urethra, nor the wound made in the operation for the stone, were in the smallest degree injured.

The fundus of the bladder, which was in a perfectly natural state, was removed, as its being kept could not convey any information respecting the disease.

aa, The portion of the bladder towards the fundus which was in a natural state.

bb, The cut edges of the coats of the bladder, separated from each other as much as the parts admitted of it.

c, The surface of the fistulous canal, leading from the bladder externally in the perinæum, formed by the wound made in cutting for the stone, which had never healed up, but had become covered by a smooth membrane. In the natural state the two sides were close together,

but in this view they are separated from each other.

dd, The edge of the external integuments in the perinæum.

e, The corpus cavernosum penis.

f, The canal of the urethra, where the penis was cut through to remove the superfluous parts. The urethra terminates towards the bladder in the wound made by the gorget in cutting for the stone. There is not the smallest appearance of prostate gland; it must have been very small, and the inflammation brought on by the operation had consolidated all those parts, so as to prevent the cut edges of the prostate gland from being distinguished.

ggggg, A number of very irregular projecting portions of coagulating lymph, loose and detached on their external surface, but fixed at their base by a firm union to the internal membrane of the bladder; the surface to which they adhere includes the whole circumference of the bladder, and extends for three inches towards the fundus.

Before the bladder was opened, if the parts could have been examined, this exsudation of coagulating lymph must have formed a zone just above the neck of the bladder, to which the stone, previous to the operation, was connected by the projecting parts being imbedded in its substance. They are still incrustated with calculous matter in a soft state.



